VOL. XXV. No 4

APRIL 1940

MECCANO MAGAZINE

SUNSHINE ON THE S.R.

6D.

MECCANO

MECHANISED ARMY OUTFIT

PRICES OF MECHANISED ARMY OUTFIT PARTS

No.			
M1	12½" Perforated Strips	½ doz.	1/6
M2	5½" " "	"	9d.
M3	3½" " "	"	6d.
M5	2½" " "	"	5d.
M6a	1½" " "	"	4d.
M10	Flat Brackets	doz.	1d.
M12	Angle Brackets, ½" × ½"	"	3d.
M14	6½" Axle Rods	"	10d.
M15a	4½" " "	"	7d.
M16a	2½" " "	"	4½d.
M24	Bush Wheels	each	3d.
M34	Spanners	"	1d.
M35	Spring Clips	box (20)	2d.
M36	Screwdrivers	each	3d.
M37	Nuts and Bolts, 7/32"	box (12)	2d.
M38	Washers	pkt. (20)	1d.
M48a	Double Angle Strips, 2½" × ½"	½ doz.	8d.
M51	Perforated Flanged Plate, 2½" × 1½"	each	3d.
M52	" " " 5½" × 2½"	"	5d.
M90a	2½" Curved Strips, Cranked, 1⅝" radius, 4 to circle	"	1d.
M94	Sprocket Chain, 40" length	"	6d.
M95a	" Wheels, 28 teeth, 1½" dia.	"	4½d.
M96	" " 18 " 1" "	"	3½d.
M103	Flat Girders, 5½"	½ doz.	1/3
M103f	" " 2½"	"	8d.
M111	Bolts, ⅜" long	doz.	3d.
M111c	" ⅜" "	"	1½d.
M111d	" 1⅛" "	"	6d.
M125	Reversed Angle Brackets, ½"	½ doz.	3½d.
M126	Trunnions	each	1½d.
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M188	Flexible Plates, 2½" × 1½"	doz.	9d.
M189	" " 5½" × 1¼"	"	1/3
M190	" " 2½" × 2½"	"	1/–
M190a	" " 3½" × 2½"	"	1/6
M192	" " 5½" × 2½"	"	2/–
M200	Curved Plates, 1 11/16" radius	each	1½d.
M212	Rod—Strip Connectors	"	1d.
M214	Semi-Circular Plates, 2½"	"	2d.
M217a	Discs, 1½"	doz.	9d.
M219	Wheel Discs	each	1½d.
M220a	Gun Barrel, Large	"	3d.
M220b	" " Medium	"	2d.
M220c	" " Small	"	1d.
	Manual of Instructions	"	3d.



Every boy is interested in the mechanised units of the British Army, and will welcome this fine Mechanised Army Outfit, which makes possible the building of models of a variety of Army prototypes.

The Outfit consists of a big assortment of specially designed Meccano Parts, including gun barrels, with which realistic models of Tanks, Anti-Aircraft Guns, Field Guns, Transport Lorries, etc., can be built. The parts are finished in the correct shade of Service green.

The model shown below is taken from the illustrated Manual of Instructions included in the Outfit.

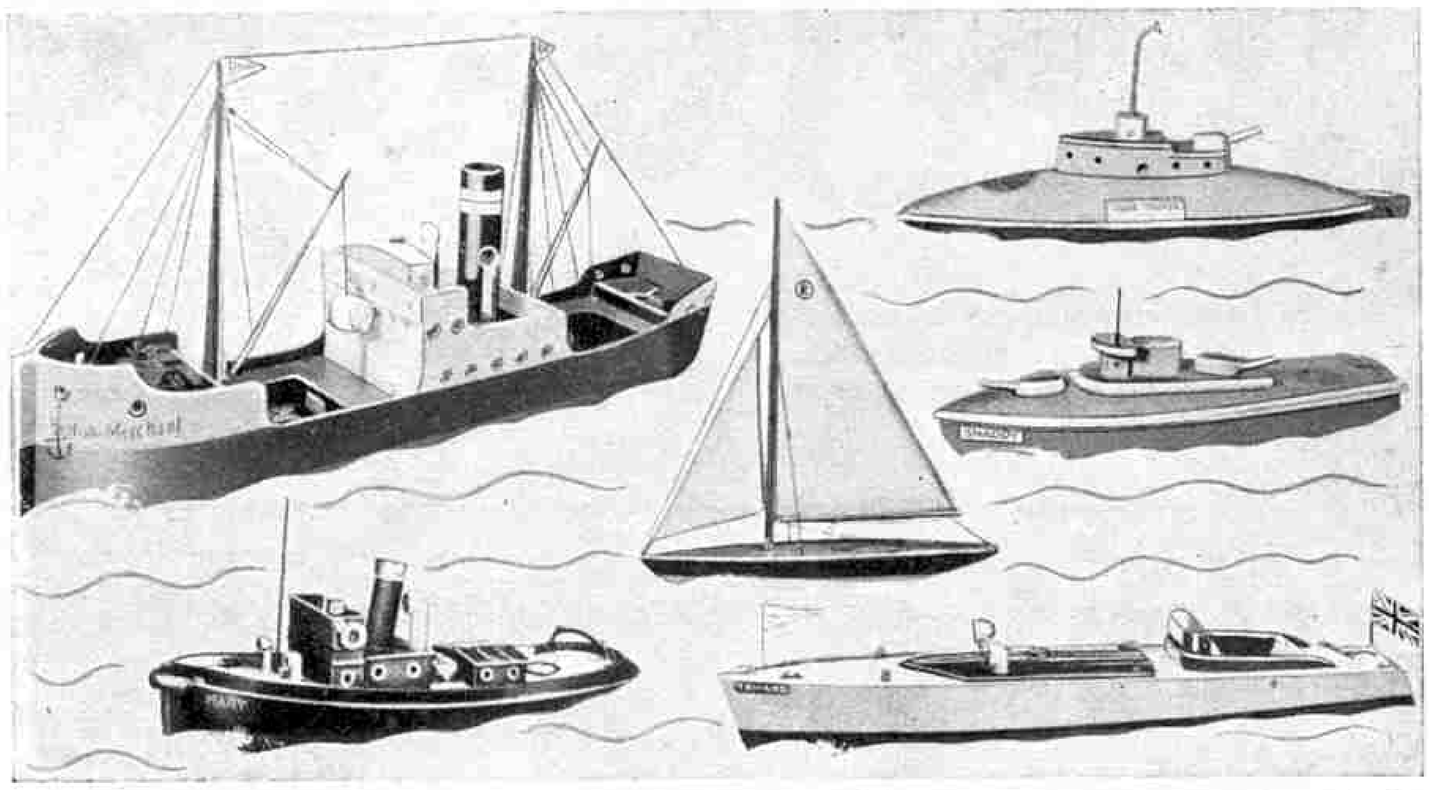
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LIVERPOOL 13

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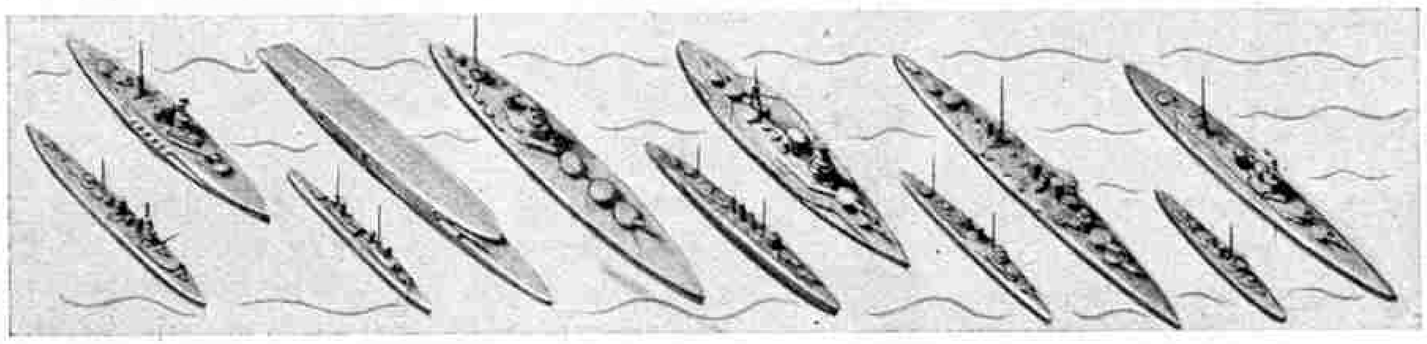
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LSF. Frosted 1/1½. **LSC** Clear 1/–
Suitable Miller or Seeco 6V 6W. **M9F** Frosted 1/4½. **M9C** Clear 1/3

Suitable for Lucas 18W
L9F. Frosted 1/1½. **L9C** Clear 1/–

M.E.S. CAPPED TRE VITA "TUBA" DYNAMO HEAD BULBS.

Suitable for 6V.5A.
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Suitable 6V.3A. and Lucifer 6V 12P.
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233 Frosted 1/1½. 234 Clear 1/–

OTHER POPULAR M.E.S. HEAD BULBS MAINLY SUITABLE FOR LUCIFER OR PHILLIPS.
(These Bulbs do not possess the Tuba advantages because they have not yet been prepared for these types.)

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185	186	8	.45	1/–	11d.	227	228	10	.45	1/–	11d.
187	188	8	.5	1/–	11d.	229	230	10	.5	1/–	11d.

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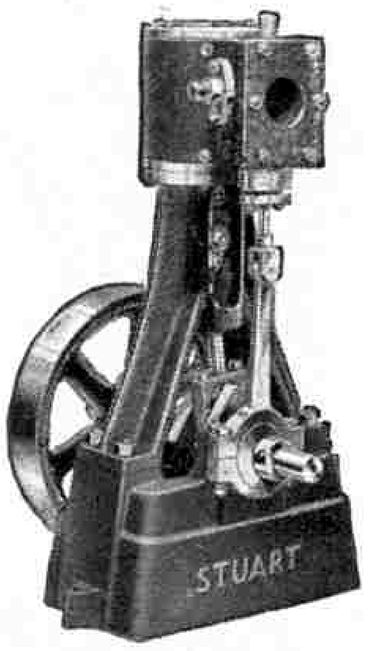
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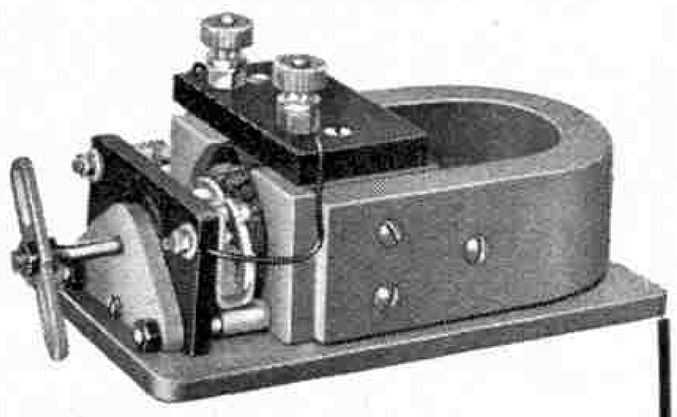
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[SENIOR SERIES]

Here's something new from the FROG factory — a series of kits for building realistic flying models of R.A.F., French and German Air Force machines. Like all other FROG models they are designed and manufactured by International Model Aircraft Ltd., a guarantee of their superb quality. All the parts are clearly printed on best quality balsa, tycoon tissue for covering and a supply of quick-drying cement are included. Blanks are supplied for both scale and flying airscrews, while engine cowls, airscrew spinners, moulded wheels, elastic motors, correct insignia and full-scale working drawings make the kits absolutely complete. Ask to see them at your local toyshop or store.

The range at present includes the Westland "Lysander," the Curtis 75a and the Messerschmitt Me 109, while the Boulton-Paul "Defiant," the Morane-Saulnier MS 406 and the Heinkel He 112 U are now in preparation. To make these machines more realistic and airworthy they can be finished with FROG tautening dope and the correct shades of FROG paint which are sold by all FROG dealers.

PRICE OF COMPLETE KIT **5/-**

FROG dope .. 7½d. per tin
FROG paint .. 4d. per tin
FROG brushes 6½d. each

Trade Mark Regd.

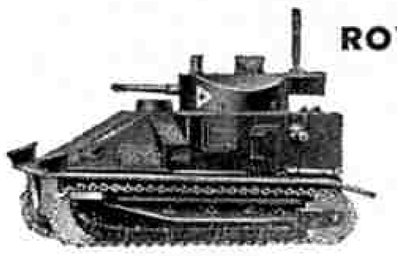
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DINKY TOYS

Among the most popular Dinky Toys models are the Mechanised Units of the British Army. They include two Royal Tank Corps Sets, an accurately modelled Mobile Anti-Aircraft Unit, an 18-pounder Quick-Firing Field Gun Unit and Royal Artillery and Royal Tank Corps Personnel.

ROYAL TANK CORPS MEDIUM TANK SET



151a



151d



150d



151c



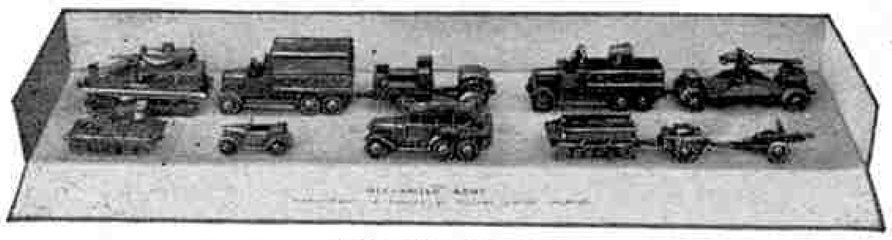
151b

Dinky Toys No. 151

No. 151a	Medium Tank	each	**1'9**
No. 151b	Transport Wagon ...	,,	**1'2**
No. 151c	Cooker Trailer	,,	**7d.**
No. 151d	Water Tank Trailer ...	,,	**5d.**
No. 150d	Driver	,,	**2d.**

Price of complete set **4'-**

MECHANISED ARMY



Dinky Toys No. 156

This fine set contains the principal units of a modern mechanised army. It includes the following items:
Royal Tank Corps Medium Tank Set (Dinky Toys No. 151) without driver.
Royal Tank Corps Light Tank Set (Dinky Toys No. 152) without driver.
Mobile Anti-Aircraft Unit (Dinky Toys No. 161).
18-Pounder Quick-Firing Field Gun Unit (Dinky Toys No. 162).

Price **12'6**

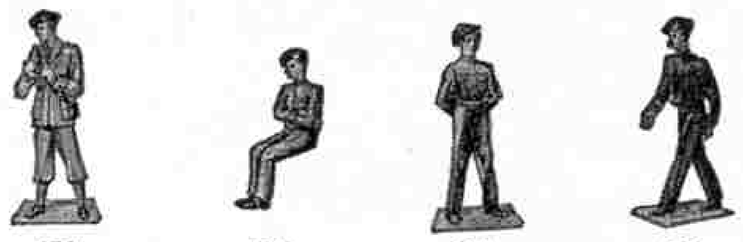
18-POUNDER QUICK-FIRING FIELD GUN UNIT



Dinky Toys No. 162

Comprises scale models of an 18-pounder Quick-Firing Field Gun, Trailer and "Light Dragon" Motor Tractor. Price **2'6** per set

ROYAL TANK CORPS PERSONNEL



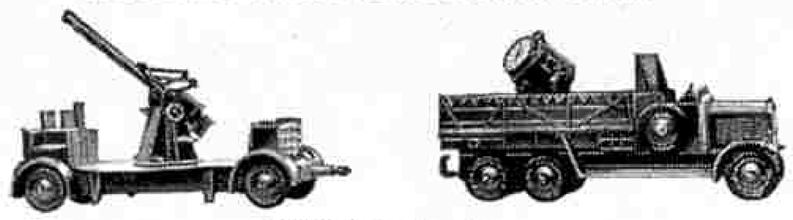
150a 150b 150c 150e

Dinky Toys No. 150

No. 150a	Officer	each	**2½d.**
No. 150b	Private, sitting (two in set)	,,	**2d.**
No. 150c	Private, standing (two in set)	,,	**2d.**
No. 150e	N.C.O.	,,	**2d.**

Price of complete set **1'-**

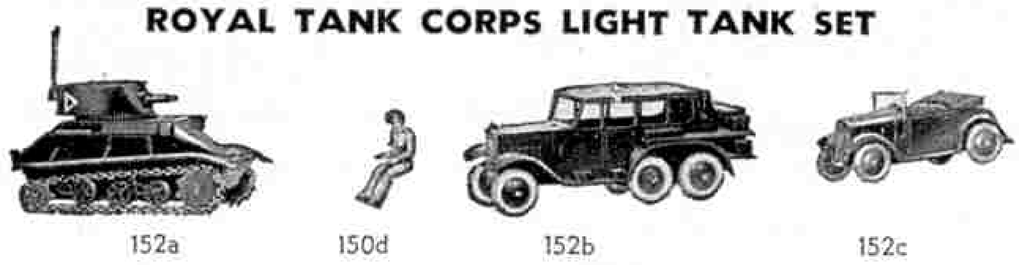
MOBILE ANTI-AIRCRAFT UNIT



Dinky Toys No. 161

Comprises scale models of a Quick-Firing Anti-Aircraft Gun mounted on a mobile platform and a Searchlight mounted on a lorry. Both Gun and Searchlight have elevating and traversing movements. Price **3'6** per set

ROYAL TANK CORPS LIGHT TANK SET



152a 150d 152b 152c

Dinky Toys No. 152

No. 152a	Light Tank ...	each **1'2**	No. 152c	Austin Seven Car	each **5d.**
No. 152b	Reconnaissance Car	,, **1'2**	No. 150d	Driver ...	,, **2d.**

Price of complete set **2'11**

ROYAL ARTILLERY PERSONNEL

Dinky Toys No. 160

For use with Dinky Toys No 161, Mobile Anti-Aircraft Unit and No. 162, 18-pounder Quick-Firing Field Gun Unit.

No. 160a	N.C.O.	each	**2½d.**
No. 160b	Gunner, sitting (two in set)	,,	**2d.**
No. 160c	Gunlayer	,,	**2d.**
No. 160d	Gunner, standing (two in set)	,,	**2d.**

Price of complete set **1'-**



160a 160b 160c 160d

A FASCINATING COLLECTING HOBBY — DINKY TOYS — OVER 300 VARIETIES

The Dinky Toys aeroplanes owe their popularity to their scale proportions, wealth of detail and attractive finish.

EMPIRE FLYING BOAT



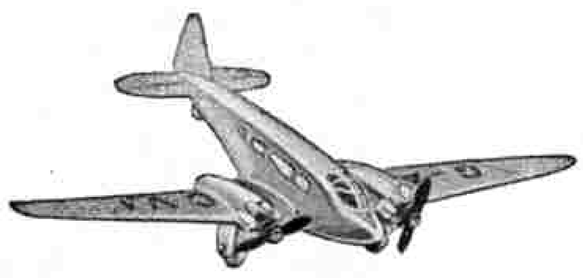
Dinky Toys No. 60r
Scale model of the Empire Flying Boats of Imperial Airways which operate fast air services between London and various parts of the Empire.
Price **1/3** each

ARMSTRONG WHITWORTH "ENSIGN" AIR LINER



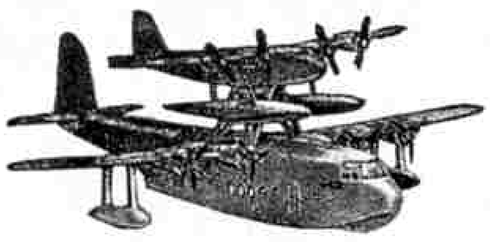
Dinky Toys No. 62p
Scale model of the largest British air liner. Six models available, named "*Ensign*," "*Elsinore*," "*Explorer*," "*Echo*," "*Ettrick*" and "*Elysian*." Price **1/3** each

AIRSPEED "ENVOY" MONOPLANE



Dinky Toys No. 62m
Scale model of the Airspeed "Envoy" twin-engined commercial monoplane. Assorted colours. Price **8d.** each

MAYO COMPOSITE AIRCRAFT



Dinky Toys No. 63
Scale model of the Mayo Composite Aircraft.
Price **2/6** each
The components of the above can be purchased separately.
No. 63a Flying Boat "*Maia*" ... each **1/6**
No. 63b Seaplane "*Mercury*" ... „ **1/-**

BOEING "FLYING FORTRESS"



Dinky Toys No. 62g
Scale model of Boeing B-17 "Flying Fortress," one of the fastest bombers in the world, and extensively used by the United States Army Air Corps. Price **1/2** each

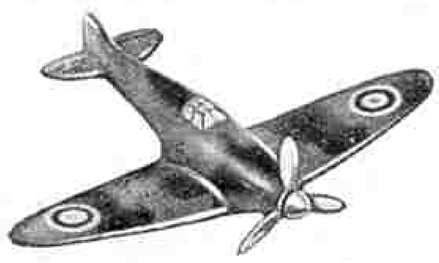
D.H. "COMET" AEROPLANE



Dinky Toys No. 60g
The de Havilland "Comet," made famous by its record flights from England to Australia, 11,300 miles, Capetown and back, 14,000 miles, and the first direct round trip by air to New Zealand and back, 24,000 miles. It is a twin-engined low wing monoplane. Price **6d.** each

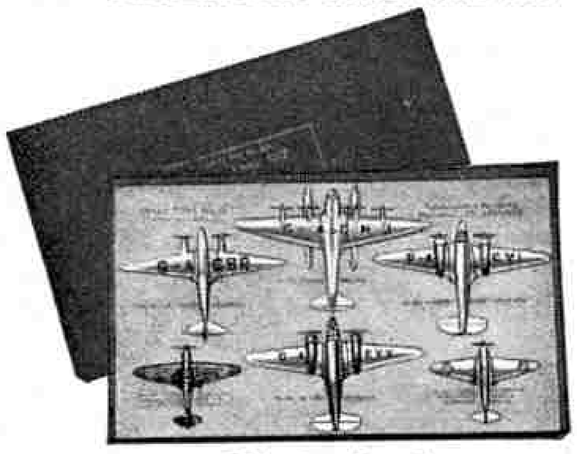
NEW THIS MONTH!

VICKERS-SUPERMARINE "SPITFIRE" FIGHTER



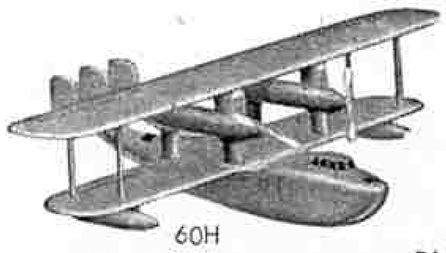
Dinky Toys No. 62e (Camouflaged)
Scale model of the Vickers-Supermarine "Spitfire," one of the fastest fighter aircraft used by the Royal Air Force.
In many successful encounters with German aircraft the "Spitfire" has proved its superiority. It is heavily armed, and has eight forward-firing fixed machine guns in the wings.
No. 62e Camouflaged ... **6d.** each
No. 62a Service Grey ... **6d.** each

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Dinky Toys No. 64
This Aeroplane Set, in presentation box, consists of one each of the following Dinky Toys:
No. 60g D.H. "Comet" Aeroplane
No. 62h Hawker "Hurricane" Single-Seater Fighter (Camouflaged)
No. 62k The King's Aeroplane—Airspeed "Envoy"
No. 62m Airspeed "Envoy" Monoplane
No. 62s Hawker "Hurricane" Single-Seater Fighter (Aluminium Finish)
No. 63b Seaplane "Mercury"
Price **4/-**

R.A.F. AEROPLANES

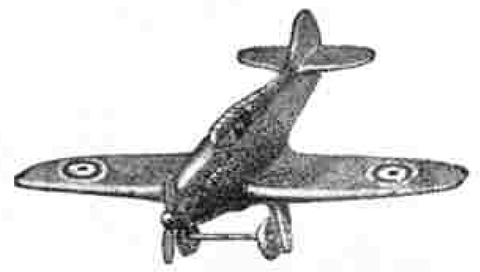






Dinky Toys No. 61
This interesting Set contains miniatures of three contrasting types of R.A.F. aircraft.
No. 60h "Singapore" Flying Boat ... ... each **1/-**
No. 60n Fairey "Battle" Bomber (2) ... ... „ **6d.**
No. 60p Gloster "Gladiator" Biplane (2) ... ... „ **7d.**
Price of complete set **3/-**

HAWKER "HURRICANE" SINGLE-SEATER FIGHTER (Camouflaged)



Dinky Toys No. 62h
Scale model of the Hawker "Hurricane" single-seater Fighter extensively used by the R.A.F. Price **7d.** each

IMPERIAL AIRWAYS "FROBISHER" CLASS LINER



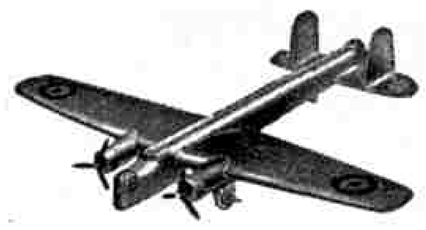
Dinky Toys No. 62w
Scale model of the Imperial Airways "Frobisher" class liner. Three models available named: "*Frobisher*," "*Falcon*" and "*Fortuna*."
Price **1/1** each

DOUGLAS DC-3 AIR LINER



Dinky Toys No. 60t
Scale model of the Douglas DC-3 air liner, which is in regular service on American and European routes. Price **1/-** each

ARMSTRONG WHITWORTH "WHITLEY" BOMBER



Dinky Toys No. 60v
Scale model of the "Whitley" long-range heavy bomber adopted by the R.A.F.
Price **1/-** each

FLYING BOAT "CLIPPER III"

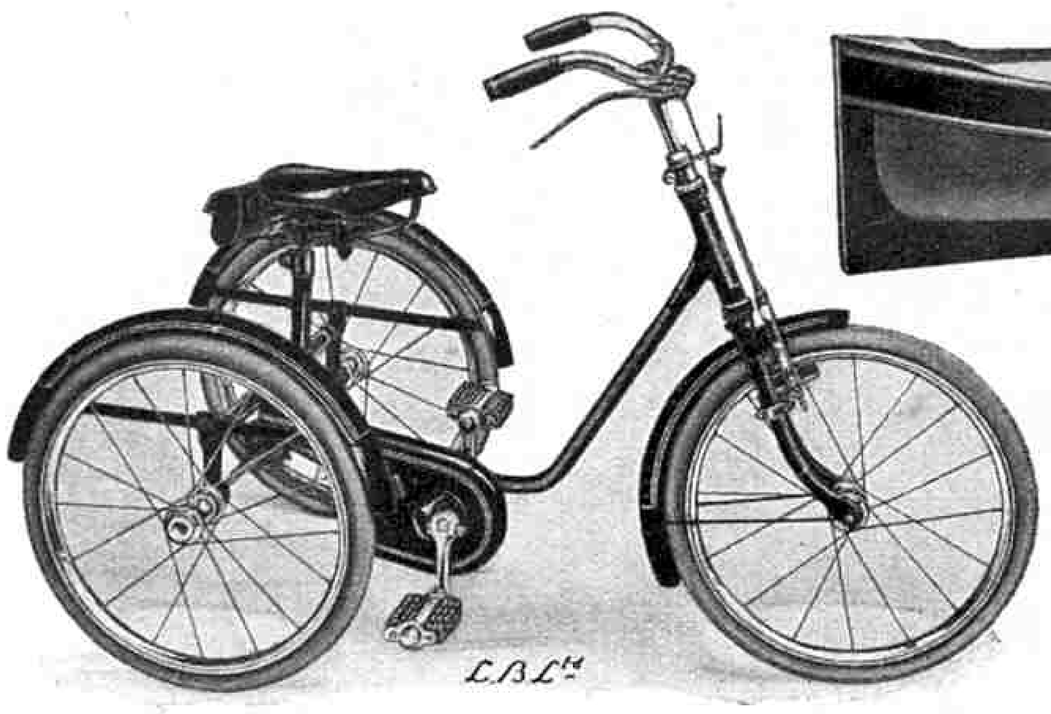


Dinky Toys No. 60w
Scale model of the Pan American Airways flying boat "Clipper III," which took part in the 1937 transatlantic experimental flights. It is a Sikorsky S-42-B all-metal flying boat.
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TRI-ANG

ALL BRITISH TOYS



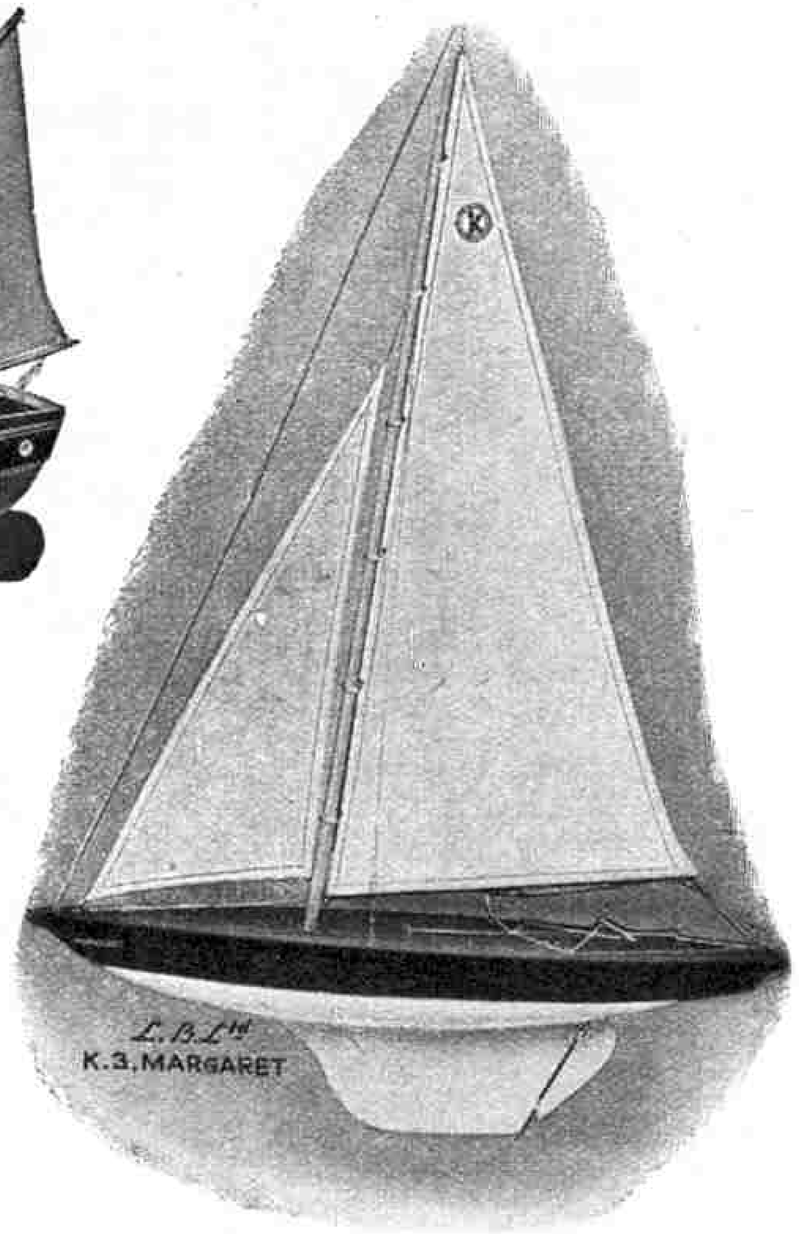
TRI-ANG TRICYCLE No. E2 (Regd. Trade Mark)

Cycle chain drive with free-wheel. Frame and forks best quality weldless cycle tubing. 16 in. front and rear wheels. 1¾ in. jointless sponge-rubber tyres. Roller lever brake. Ball-bearings throughout. Coil spring saddle. CHROMIUM FITTINGS. Black, blue or maroon.



CLOCKWORK STEAM DRIFTER

Realistic model with strong, long running clockwork mechanism, adjustable mizzen sail and rudder, dummy ventilators, etc. Length of hull, 16½ in.



'K'

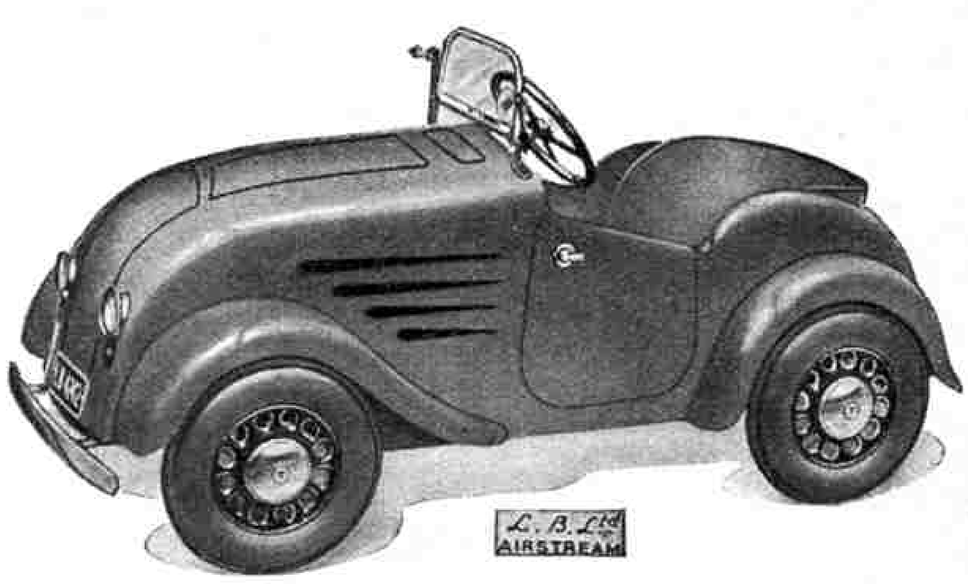
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SPEED BOATS, ETC.

"K" YACHT "MARGARET"

Magnificent craft with AUTOMATIC STEERING. Patent light-weight weather resisting hull. Solid mahogany polished deck. Mast and boom made from finest selected material, best quality sails, fully adjustable. Beautifully finished in blue and white. Length of hull, 26 in.



TRI-ANG AIRSTREAM

New Model. Steel body with opening side door, upholstered seat. Adjustable wind screen and direction indicators. 9 in. new type easy-clean wheels with malleable hubs, ⅝ in. tyres. Hand brake. Length 44 ins. Suitable for ages 4 to 7.



TRI-ANG SPEED BOAT No. 3

Specially designed hull with mahogany deck, brass fittings, ventilators and detachable motor cover. Electric motor mechanism. Complete with bow pennant and stem flag. Hull 20½ in. overall.

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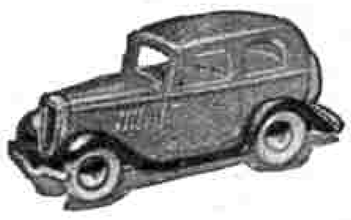
TRI-ANG TOYS

Obtainable from all good toy shops and stores.

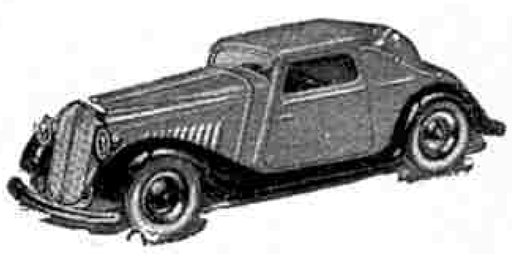
MINIC

ALL TO SCALE CLOCKWORK TOYS

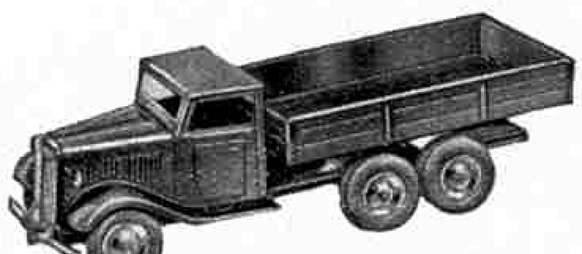
Almost every type of road transport is represented. Each model is strongly constructed and fitted with long running mechanism and some are fitted with electric lights.



MINIC Ford Saloon. Also obtainable in camouflage colours.



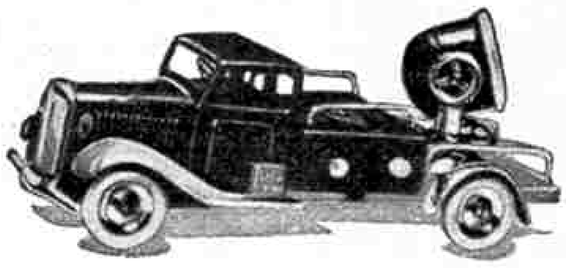
MINIC Vauxhall Cabriolet. Also obtainable in camouflage colours.



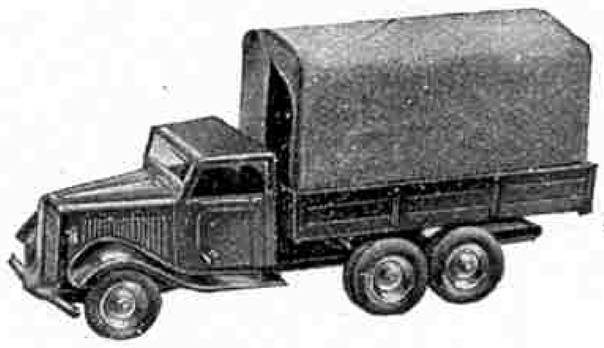
MINIC Six Wheel Army Lorry. Also obtainable in camouflage colours.



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Next Month: "B. BIRA'S MOST EXCITING RACE." Publishing Date: 1st May

MECCANO MAGAZINE

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April 1940

With the Editor

Readers and the War

My correspondence since the beginning of the year has been a source of enormous interest to me, as an indication of what readers are thinking and feeling during this time of war. Before I go on to speak of the letters themselves I want to mention a fact that in itself is of quite remarkable interest. This is that whereas there was a very considerable fall in the number of letters during the first three months of the war, there has been a great and growing increase since Christmas—so much so that my post-bag is now bigger than ever. And a notable feature is the large proportion of letters from readers who have never written to me before, although they have taken the *"M.M."* for years.

To come now to what all these letters are about. They fall into two main groups. First of all there are those that concern model-building, model railways and similar activities. To read these one would never get the slightest hint that there was a war on at all. They show that the readers are carrying on their hobbies with all their old keenness, and that the long winter blackout has not affected their spirits one bit. Well done, all those readers! Then, by way of contrast, there are letters, scores and scores of them, bubbling over with news and telling of fathers and brothers who have joined the fighting Forces or taken up some other form of war work. These letters, coming from Home and Overseas, are splendid to read. They show the resolute determination of the whole Empire to win this war against the wickedness and appalling cruelty of the Nazi regime.

The answering of all these letters is a tremendous task, but one that gives the greatest pleasure to me and my staff.



General Sir Walter M. St. G. Kirke, G.C.B., C.M.G., D.S.O., A.D.C., Inspector-General of the Home Defences.

Staff on Active Service

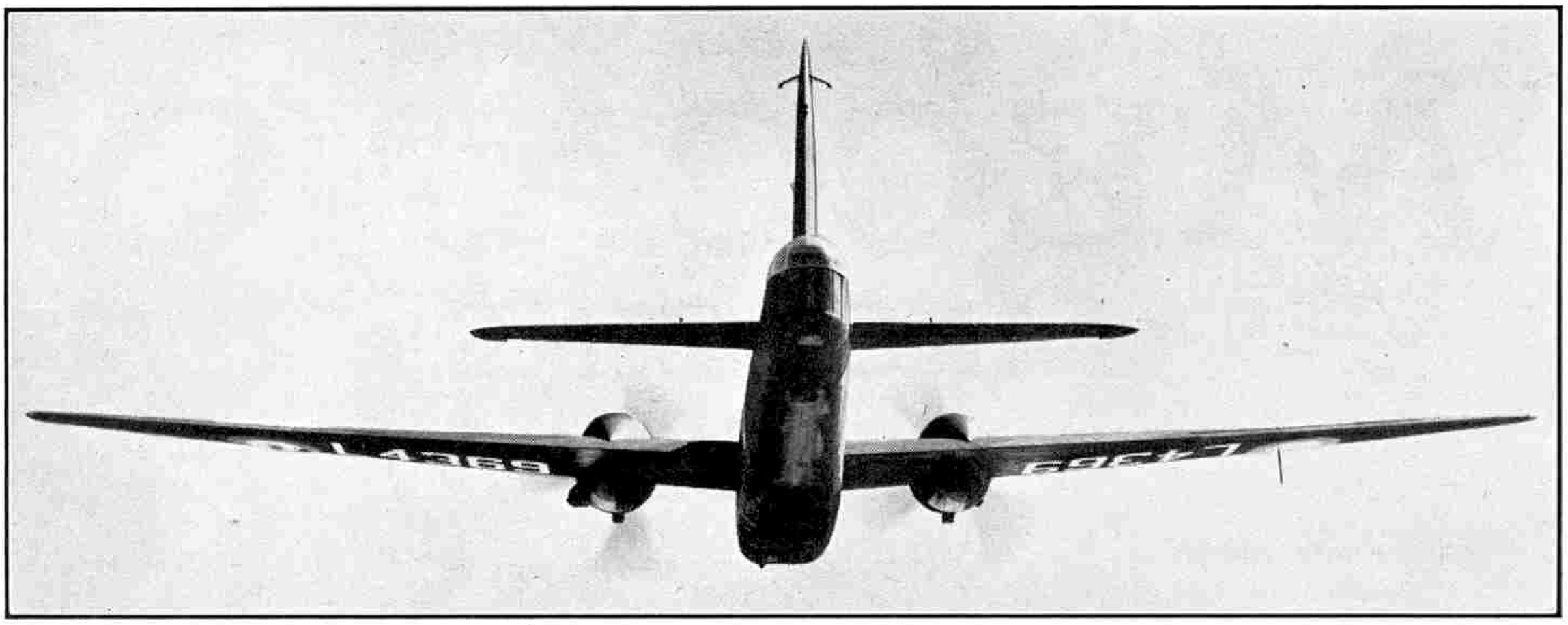
By the way, this reminds me that readers may be interested to know that already six of my staff are on active service, one in the Navy, four in the Army, and one in the R.A.F. Five of these have been able to call to see me when on leave. They are all bronzed and splendidly fit, and amazingly keen on their jobs. Another of my staff is a full-time member of the Auxiliary Fire Service, and his only grouse is that so few fires occur in his district! The absence of these seven makes it very hard to get the old *"M.M."* to press each month; but those who remain are putting their backs into their work in a wonderful way, and I take this opportunity of expressing my appreciation of their loyal help.

Leaders in the War

VII. Sir Walter Kirke

General Sir Walter M. St. G. Kirke was born in 1877. He served in the Waziristan Campaign on the north-west frontier of India in 1901-2, and in 1905-6 commanded the Wellaung Punitive Expedition in the South China Hills. In the World War he was awarded the D.S.O.

From 1918 to 1922 Sir Walter was Deputy Director of Military Operations. After two years on the General Staff, Aldershot, he went as head of the British Naval, Military and Air Force Mission to Finland. He was Deputy Chief of the General Staff in India from 1926 to 1929, and since then he has held a succession of important appointments at home, including those of General Officer Commander-in-Chief, Western Command, from 1933 to 1936, and Director-General of the Territorial Army during the next three years. In 1939 he was appointed Inspector-General of the Home Defences.



Vickers "Wellington" bomber as seen by a pursuing enemy fighter. It is a dangerous view, as the tail gunner in the bomber can easily bring the stern armament to bear.

A Day Out for the Bombers

By Captain H. S. Broad, A.F.C.

An account of a purely imaginary, but typical, raid by "Wellington" bombers, as seen from the cockpit of the Youngest Pilot Officer.

"INTELLIGENCE," said the Station Adjutant to the C.O. of the Squadron, "says that three German destroyers are streaking home down the Norwegian coast, and should be back at "Windy Corner" by dusk to-morrow evening.

"I have orders for you to take your Squadron and get 'em. Make contact as nearly as possible at sundown, so that you have a good chance to avoid enemy interceptors. If necessary, follow the destroyers into harbour, but don't drop anything if there's the remotest chance of hitting civilians or their property. The A.O.C. has stressed that again."

"Windy Corner," you should know, is the angle of land where the German coast forms a right-angle south of the Frisians.

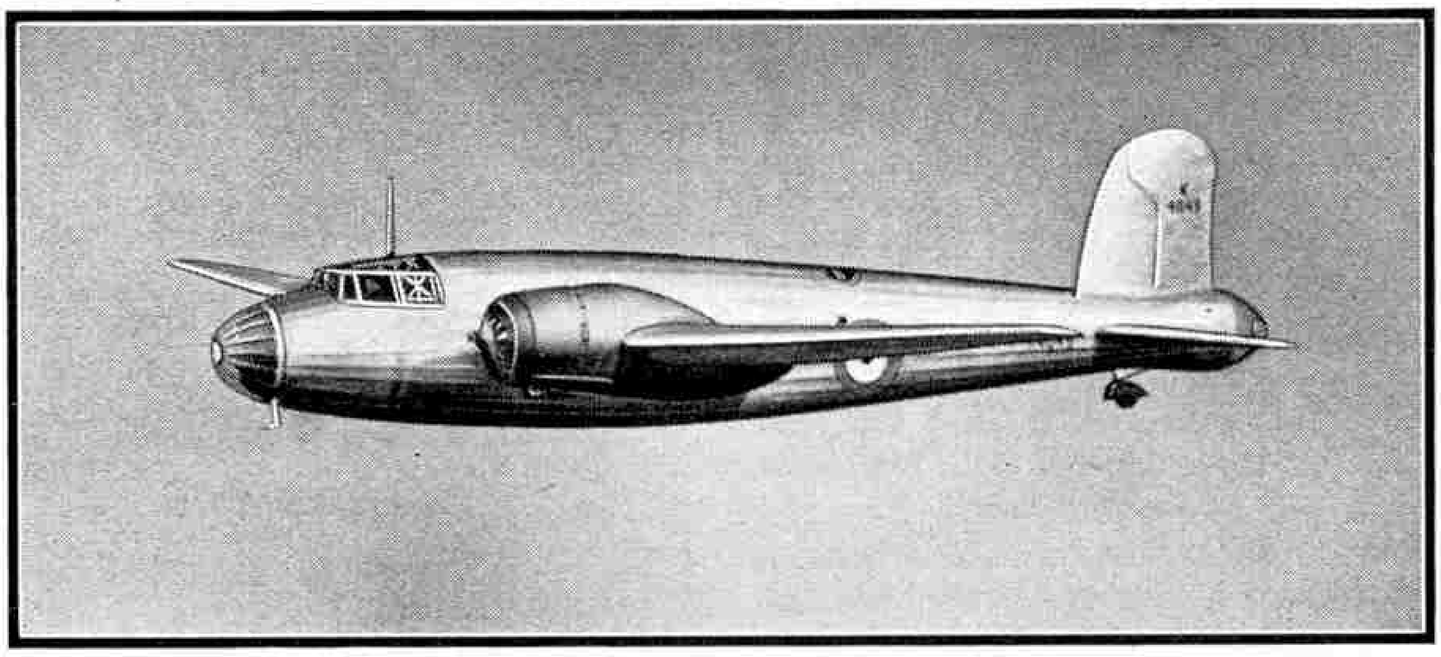
The C.O. went away and called together his three Squadron Leaders who, in turn, passed on the orders to the crews of the three "Wellingtons" in each flight. And then they all went to bed, these young veterans in their early twenties, and slept soundly.

All, that is, except the Youngest Pilot Officer, whose first raid this would be.

A little after mid-afternoon the next day he sat in his cockpit, the starboard wing man in the leading flight. His leader moved off and turned into wind, he and his opposite number on the other wing keeping position with him. The Youngest Pilot Officer, no longer excited now that there was something to do, looked round to see that his constant speed "props" were set to the fine limit for the take-off; that the hydraulic power lever was in the "on" position ready to raise the undercarriage; that the engine-cooling gills were in the correct position, and that the flaps were set at 20° to assist the take-off. He had automatically set his tail trim and rudder-bar in the "get off" positions.

They flew in formation, but not too close; the closer you are to each other, the harder work it is for the pilot to juggle continually with his throttle openings.

When he looked down and saw, through patches of broken cloud, that they were crossing the coast, they were still climbing. His eye roamed automatically over the dials registering oil pressure and temperature and cylinder-head temperature. Not that he expected any irregularity in their readings. Finding none, he moved the mixture control over the "weak" and, noting that they were now at a certain height that he knew to be the correct one, switched over to the second supercharger which, now they were operating at some height, would "blow" the engines at a higher rate



A "Wellington" of 1937 in the air. Photograph by courtesy of Vickers (Aviation) Ltd.

if for any reason the throttles had to be opened.

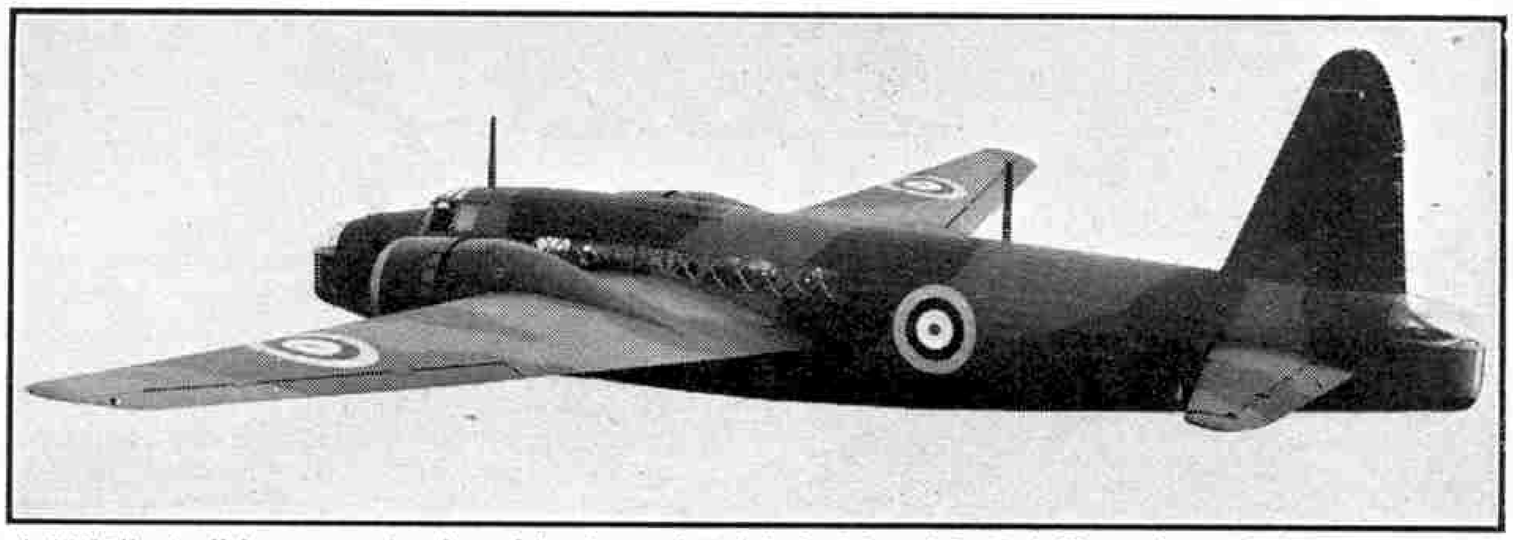
Although not absolutely necessary for the height he was at, but chiefly for its warning effect, he slipped on his oxygen-mask and opened the oxygen-valve. A youth who loved the warm days of summer, he thought without relish of the thirty degrees of frost they would probably have to endure before they got back home.

At 15,000 ft. they flattened out and cruised, for economy's sake, at something less than 200 m.p.h., for they had ample time before them. It still wanted an hour of sunset when they sighted the coast of North Denmark straight ahead, and turned towards the south, knowing that, if their information was correct, their quarry was somewhere ahead of them.

For close on an hour there was nothing to be seen but the low-lying Danish coast. Then a green light soared from the leading "Wellington," and the Youngest P.O. knew that his senior had spotted something. Straining his eyes, he saw a smudge of smoke. A few minutes later there was no doubt that here were the destroyers they had come out to find—"I wonder how Intelligence knew?" the P.O. asked himself, as he watched them steering along in line ahead.

And to complicate matters, there was the island of Sylt well in view ahead of the destroyers. It would be a matter of minutes only before the German interceptors appeared.

He thrust out his hand and pulled back the throttle lever as he found himself closing up with his leader. The latter had already swung to the right, and throttled down to lose height in readiness for the attack. Everyone had been told exactly what to do, and he fell in well behind. The leading flight would attack along the line of the three destroyers, from the rear. The other two would wheel different ways and "straddle" their objective in turn. It is hard to believe unless you have seen results, that in actual practice it is easier to hit a long objective—a line of ships, a train or a road—by flying across it with several machines, which drop their bombs at intervals until one hits the mark. Easier, that is to say, than by flying along the line, as you would have supposed.



A "Wellington" long-range bomber of the type referred to in this article. This illustration and the top one on the previous page are by courtesy of "Flight."

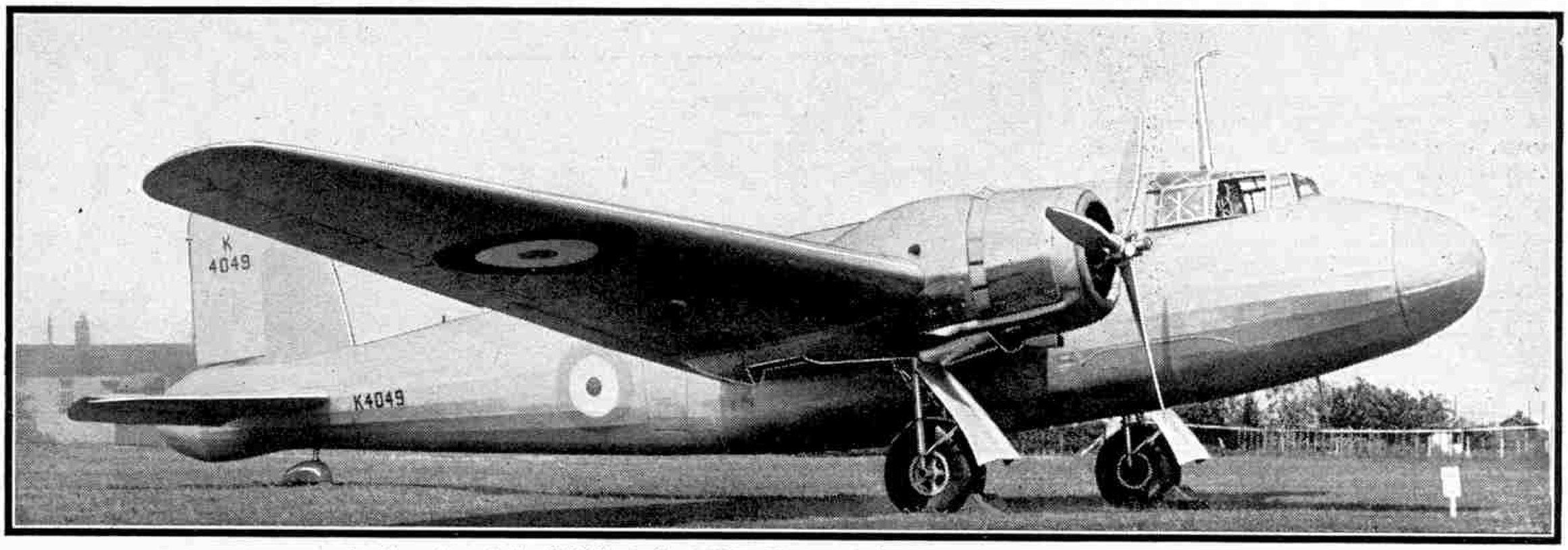
However, both methods were to be tried this time. Each machine in the leading flight would release two heavy bombs—one at the third and one at the first ship in the line. At 3,000 ft. the leader flattened out, made a slight left-hand turn to bring him into the exact line of the warships, and a moment later dived and released his first bomb. The P.O. had time to note that it fell to the right of the last destroyer, and altered his own course a shade to port a moment before his bomber let go the first missile.

A brief pause, and the second went on its mission of destruction, the machine feeling noticeably lighter by this time.

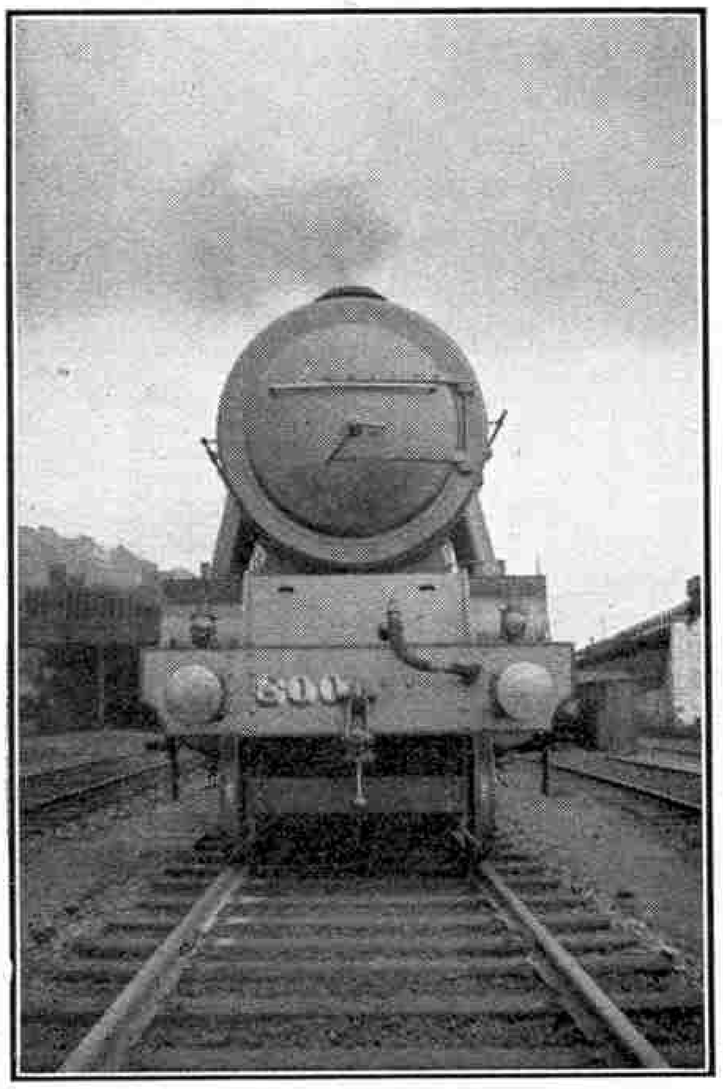
A rather surprising thing, at first sight, is that it is seldom possible to tell which bomb scores a hit when a number of machines take part. It is essentially a team game! The P.O. would be quite satisfied to be one of the squadron that caused the damage.

The rattle of pom-poms from the destroyers passed almost unnoticed, though plainly audible above the noise of the engines. However, neither side had escaped scot free. For the P.O. and the man behind him closed in again on their leader, who made a wide turn, opened his throttle, and made his best speed for home, lest they should be caught during those remaining and highly dangerous minutes of daylight. And as they turned the P.O. saw several things.

One destroyer listed heavily to starboard, evidently badly hurt. Another was steaming at an angle to her original direction, and this puzzled him until he realised that her steering gear must have been damaged. On the other hand, one of the other two flights contained one machine only. (Continued on page 208)



Another view of the "Wellington" of 1937. Photograph by courtesy of Vickers (Aviation) Ltd.



A striking front end view of the new G.S.R. 4-6-0 No. 800 "Maeve." Note the flat-bottomed rails.

New Irish 4-6-0 Locomotive

Magnificent Work on Severe Test Run

By a Railway Engineer

FOR a long time prior to her appearance last year it had been known that a new 4–6–0 locomotive of notable proportions was under construction at the Inchicore Works of the Great Southern Railways. When she did appear it was to win admiration on all hands; and in appearance, design, and performance she was soon well established as one of the really outstanding locomotives of the British Isles. On her very first run with the accelerated Dublin–Cork mail she attained a speed of 93 m.p.h.

A month later I was privileged to ride on her from Dublin to Cork, and back. It was a unique experience, and one that I greatly appreciated, to travel on a locomotive still under close observation by the Chief Mechanical Engineer's department; she was still on test, as it were, and in the up direction was set a task harder than anything previously attempted. Apart from the maximum speed attained on the inaugural run, nothing whatever had up to then been published as to her work; and so it was in anticipation of no ordinary footplate trip that I watched No. 800 come backing down into Kingsbridge Station, Dublin, to take the 7.15 a.m. mail to Cork.

The turnout of the locomotive that morning was literally spotless. She is painted a bright green that has just a hint of blue in it, an attractive colour well set off by smart lining, and the picturesque rendering of the name, "*Maeve*," in native Irish characters. In general size and power she has been likened to the "Royal Scots" of the L.M.S.R., and the layout of her machinery includes the important likeness of a divided drive; the two outside cylinders drive on to the middle pair of coupled wheels, while the inside cylinder drives on to the leading pair. Externally the front-end is decidedly reminiscent of the Great Western "Kings." Another interesting feature of the front end is the division of the exhaust. "*Maeve*" has a double-chimney, but not on the Kylchap principle; the inside cylinder exhausts up the forward orifice, while the two outside cylinders exhaust up the after one.

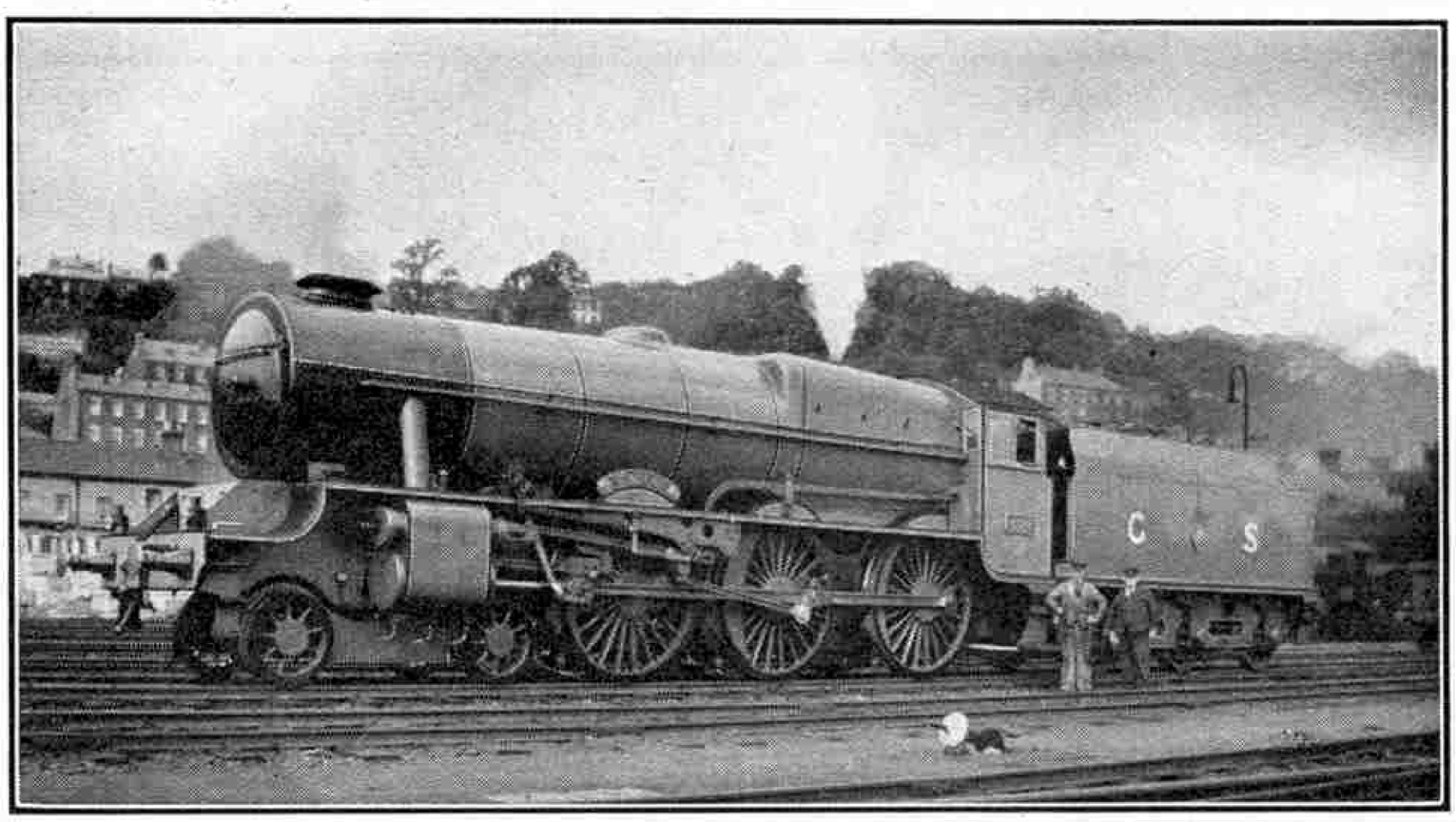
As to general dimensions, the cylinders are 18½ in. in diameter by 28 in. stroke; the coupled wheels are 6 ft. 7 in. in diameter; the working pressure is 225 lb. per sq. in., and the weight of the engine alone, in working order, is 84 tons. But quite apart from the impressive appearance and general size there was ample evidence of the endless care and thought given to the design as a whole, both in its broad outline and in the smallest details. Among interesting items in a well laid out cab are a screen-wiper for the driver's look-out glass, and a neat receptacle for the long fire-irons: one usually sees the latter stowed anyhow on the tender.

Coming now to the runs themselves, the mail usually carries through coaches from Dun Laoghaire Pier, but on this trip, made at the height of the holiday season, the main portion from Kingsbridge was already so heavy that the carriages making the cross-channel connection had to follow as a second division of the train. Our load amounted to 323 tons tare and about 340 tons with a full complement of passengers and luggage. Driver Broderick and Fireman Sheehan, of Cork Shed, were in charge. With this train load "*Maeve*" had a positive holiday outing. After the initial 30-mile run to Kildare, the continuation consists of a series of short fast runs from station to station, not more than about 20 miles in length. Typical spurts were from Kildare to Maryborough, 20.9 miles in 21½ minutes, and from Ballybrophy to Thurles, 19.9 miles also in 21½ minutes. The road is undulating, and the top speed on each section was usually well over 70 m.p.h. From each station stop "*Maeve*" got away with superb ease, and soon developed such a tearing pace that usually Broderick had to ease her up markedly to avoid gaining too much time.

South of Thurles some really spectacular work was done. A lightning start brought speed up to 76½ m.p.h. in about five miles, and a continuation, over pronounced ups and downs in the road, at 63 to 73 m.p.h. continuously took us past Grange Signal box, 17½ miles, in exactly 17½ minutes. So we came to that curious layout at Limerick Junction that needs reversal of the train to get into the platform Driver Broderick then showed how the Great Southern drivers have made a fine art of train working here We came to a stop; in 12 seconds the engine was reversed and commenced to back and in precisely two minutes from the first stop we were at rest at the platform!—23 minutes dead from Thurles, a remarkable feat, since the station-to-station distance is 20½ miles.

The last two stages of the run were a sheer joy to experience. We headed south in gloriously fine weather. Looking through the cab glasses the vivid green of "*Maeve's*" portly boiler was almost matched by the brilliance of colouring in the Irish countryside, and an exhilarating buoyancy in the riding of the engine added to the sensation of speed. That must not be taken to imply that our actual speed was commonplace; far from it. At Kilmallock we were beating up a merry 82 m.p.h., and 37.6 miles from Limerick Junction to Mallow run start-to-stop in 37¾ minutes tell a tale of first-class running.

The last stage begins with the long toilsome ascent past Mourne Abbey, with 6½ miles rising continuously at 1 in 125 to 140. While we waited to start from Mallow I recalled the thunderous efforts of the 2-cylinder 4–6–0 No. 401 on my last trip on the Mail, described in the "*M.M.*" for November 1937, and how working practically all out she roared uphill at some 35 m.p.h. "*Maeve*" had the same load, yet when we started away up that bank I felt sure that some one had ironed out the gradient! With an exhaust so quiet as could hardly be heard on the footplate, she went sailing up in airy-fairy style, doing 47, 50 and finally 52 m.p.h.! It was the cul-



No. 800 "Maeve" at Glanmire sheds, Cork.

mination of a remarkable trip, and after a top speed of 77 m.p.h. downhill through Blarney we completed the 20.8 miles from Mallow to Cork in just 24 minutes.

On this down journey it had been obvious after the first mile out of Dublin that the engine was overwhelmingly master of the job, but circumstances were very different before the start of the return run, on the 4.5 p.m. up Mail. When I joined Driver Foley and Fireman Ryan—a Dublin crew this time—the atmosphere down at Glanmire shed was such as to be called tense with expectancy. "*Maeve*" was to have her greatest test yet, for the load had been given as "equal to 27." I should explain that the G.S.R. reckon all train loads in coaches, rather than actual tonnages; a bogie coach counts as "two," and a four-wheeler as "one." The tare weight came out at no less than 423 tons—450 tons with passengers and luggage. This may not, at first sight, seem anything out of the ordinary for a locomotive of "*Maeve's*" size; it is not, over a level or gently undulating road. But starting out of Cork is like going up the side of a house!

Immediately on leaving the station the line enters a wet tunnel on a grade of 1 in 78, which steepens, if you please, to 1 in 60, and continues so till one is 3¼ miles out of the city. This is a formidable bank if ever there was one, and until "*Maeve*" came upon the scene the G.S.R. have always treated it with the greatest respect. I recall a previous journey on the same train some years ago when the load was 390 tons, and then no less than *three* locomotives were provided, 0–6–0, 4–4–0, and 4–6–0 in tandem! Between them they climbed the bank at 24 m.p.h.

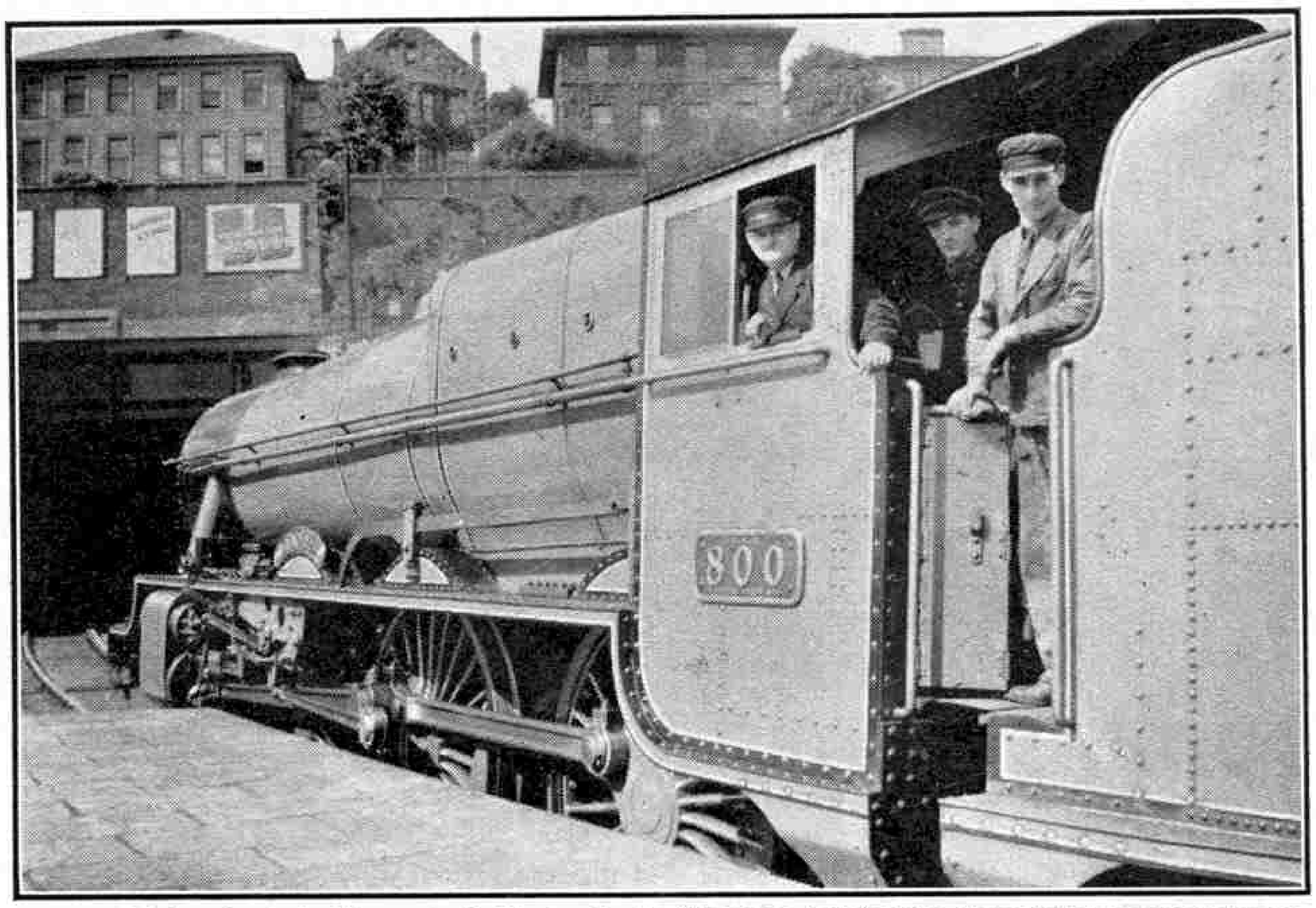
It was small wonder that the Cork locomotive authorities waited with the keenest interest to see how "*Maeve*" would take 450 tons up, without any assistance whatever. With us on the footplate there came the Cork District Locomotive Inspector, and an Inspector from the Chief Mechanical Engineer's Department at Inchicore. The final ingredients of a great occasion were furnished by the Saturday afternoon crowd that gathered on the station platforms; "*Maeve*" is evidently one of the sights of Cork.

At length there came the "right-away," and with a beautifully clean start into the tunnel we went. Regulator full open, reverse nearly full forward, the sensation was thrilling beyond words. The lively tattoo of the exhaust beat quickened perceptibly, and it was soon evident that "*Maeve*" was fairly "lifting" her 450-ton load. In the glare of the fire anxious faces looked up to the pressure gauge; there was no need, the needle was stock still and the boiler supplying all the steam required for this mighty effort. With a joyful roar we came out into the open, and then the exhaust steam went soaring straight up skyward. Several times I have been on small engines being driven almost "flat-out," but never on one of "*Maeve's*" size. One was conscious of a terrific output of energy; the whole frame of the engine quivered faintly under the load, but there was never a shadow of doubt that she was right on top of the job.

Up the 1 in 60 we sustained the really wonderful rate of 22½ m.p.h., whereas it had taken three other engines between them to do 24 m.p.h., with 390 tons. This comparison alone is enough to show what "*Maeve*" can do. So we were past the summit of this precipitous incline, 3.3 miles from the start, in 9½ minutes!

It was a gruelling test at the beginning of a long fast run, and Driver Foley, very wisely I thought, did not press the engine on the easier rise from Blarney past Rathduff. But on getting away from Mallow we were again treated to a splendid climb. Here the line rises for 4¼ miles at 1 in 150 to that wayside signal box so quaintly named Two Pot House. It was climbing of a different kind now, for the engine was linked well up, and with a brisk business-like purr from the exhaust we accelerated finely to 38½ m.p.h. Once over the top, with the gear still further linked up, "*Maeve*" soon showed what she could do with a 450-ton load on this sharply rising and falling stretch of line.

We were getting along at a fine general average of 60 m.p.h. when unfortunately



"Maeve," before the start of the run to Dublin described in this article. Left to right: Driver Foley, Inspector Murphy, and Fireman Ryan.

we suffered a severe signal check at Emly. This prevented us keeping time to Limerick Junction. In this connection I should also explain that the reversal of direction is a decidedly more ticklish operation with an immense length of train such as we had, and cannot be done with the extraordinary slickness displayed on the down journey. In the first place we had to run farther beyond the platforms in order that the tail of the train should be clear of the trailing crossover. Still it was really smart work to reverse in 40 seconds, and to back into the platform in 1¾ minutes.

On the next stage it was interesting to observe how the engine got away on a practically level road; the driver linked up fully very soon and allowed "*Maeve*" to find her own stride. The working conditions were extremely easy, for the regulator handle was over only just far enough to bring the main valve into operation, and yet it was sufficient to whip that long train into a romping stride; the 11¾ miles out to Goulds Cross were covered in 15¾ minutes, and by then we were going at 68½ m.p.h.

But it was on the final run that the most spectacular speed exploit occurred. Here the mail gets a spell of over 50 miles non-stop, 50.9 to be exact, from Maryborough into Dublin, and the fact that we were a little late (on account of heavy intermediate station working) gave the crew a chance to show what they could do. The line descends on easy gradients at first, and here "*Maeve*" was soon up to 67½ m.p.h.; but the impetus thus gained was nullified by the existence of a temporary speed restriction to 40 m.p.h. through Portarlington station. This did not cause much trouble, however. In response to a fraction of a turn extra on the reversing screw, "*Maeve*" accelerated splendidly on the level and passed Monasterevan at 67 m.p.h. A careful adjustment of the controls, and we went finely up the 1 in 180 ascent to Kildare, with valves still linked well up and hardly a sound from the exhaust. Cherryville Junction, half-way up, was passed at 56 m.p.h., and so to Kildare itself, picturesque on its hillside in the mellow evening sunlight, through the station and over the crest, doing exactly 50 after 4 miles of the grade.

The engine rode most smoothly round the comparatively sharp curves over the downland of the Curragh, and then there began a glorious final sprint for Dublin. This had been a run of contrasts indeed, and as we now swept along, rarely going below 70 m.p.h., that terrific pull out of Cork seemed but a distant memory. The exertions of the journey had left their mark on us all, however, and our blackened faces seemed quite out of keeping with the cool fragrant countryside through which we were now speeding. "*Maeve*" was using the merest breath of steam. The gradients are not by any means all downhill, yet we flew through Newbridge at 79 m.p.h., kept up 74 to 76½ for mile after mile through Straffan and Hazlehatch, and on passing Clondalkin the 46½ miles from Maryborough had been reeled off in 45¼ minutes.

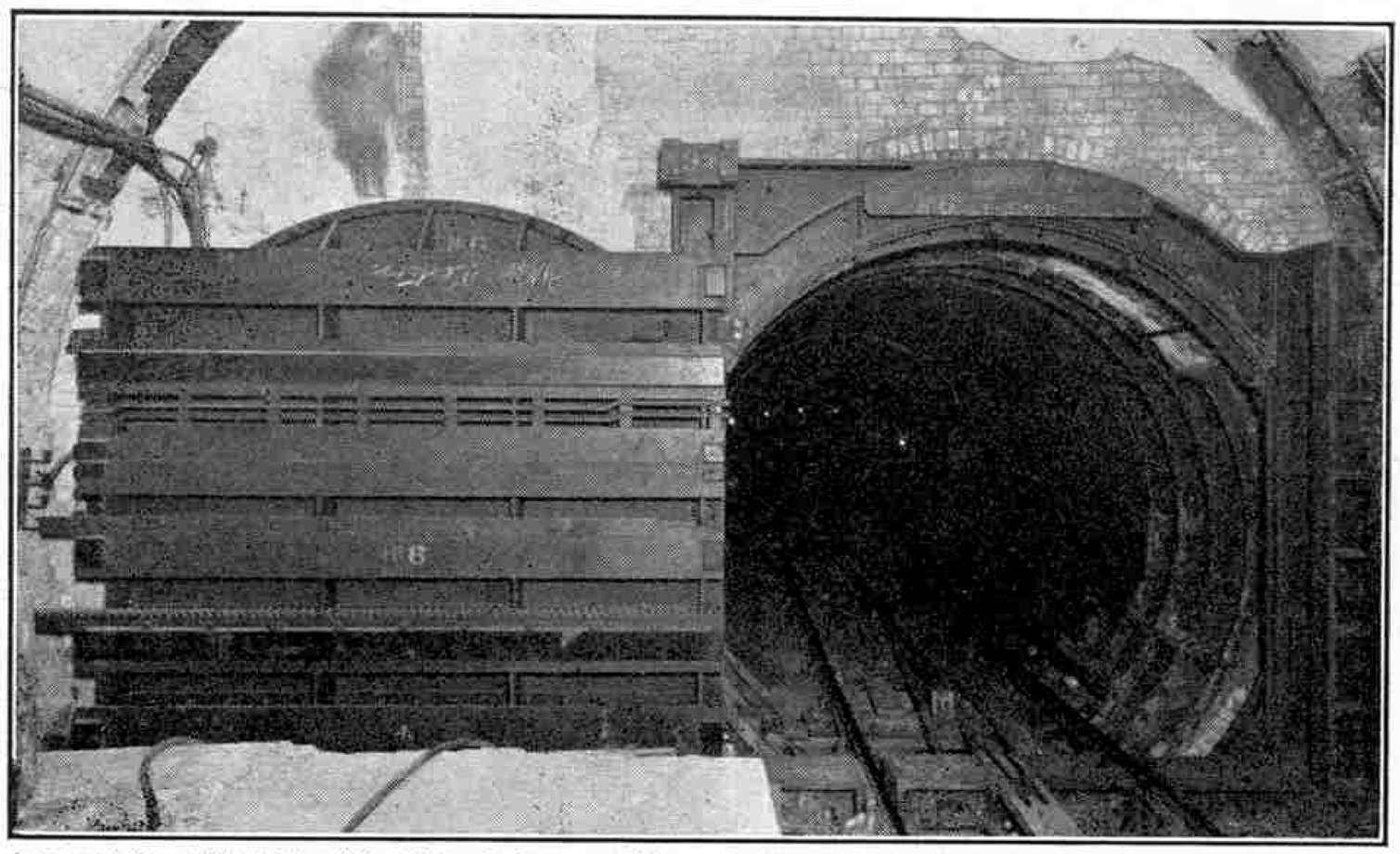
But now we were nearing journey's end; steam was shut off, and we coasted down the steepening gradients, still, however, going over 70 m.p.h. Then the brakes were applied a little; past Inchicore works, brakes on harder, and so quietly into Kingsbridge terminus in the brilliant time of 50½ minutes from Maryborough, 50.9 miles, 7½ minutes under booked time.

Air-Raid Precautions on London's Underground

Steel Gates Guard Tunnels Against Flood Damage

By T. R. Robinson

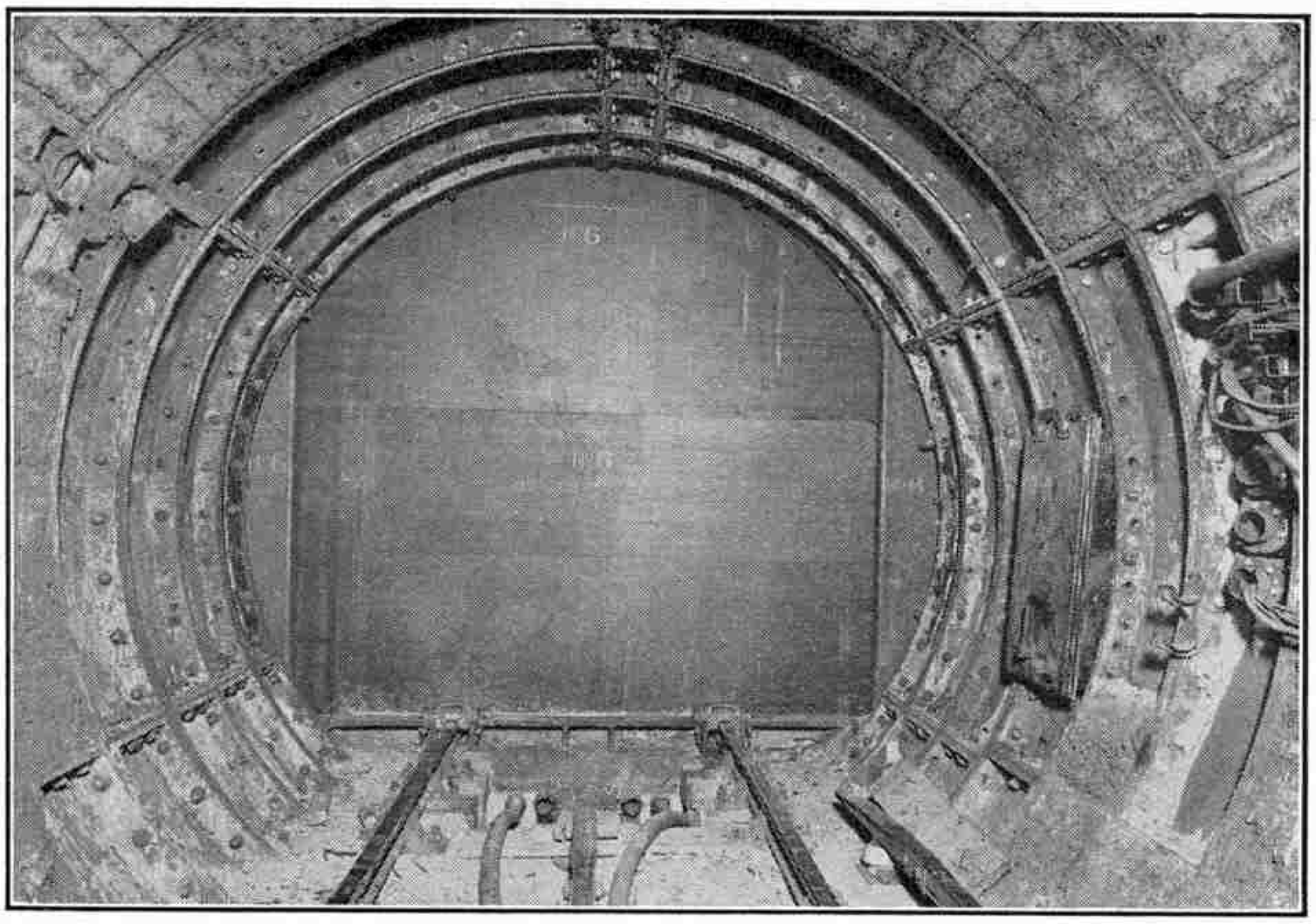
ONE of the most difficult problems that have confronted London Transport in their A.R.P. measures is the protection of the tunnels of the Underground system against flooding from the River Thames, or from sewers and water-mains running near the railways, in the event of damage from bomb explosions. The method adopted has been the provision of floodgates at each end of the tunnel sections liable to damage, and these gates, in conjunction with certain other protective works, render travel on London's Underground as safe as in peace-time.



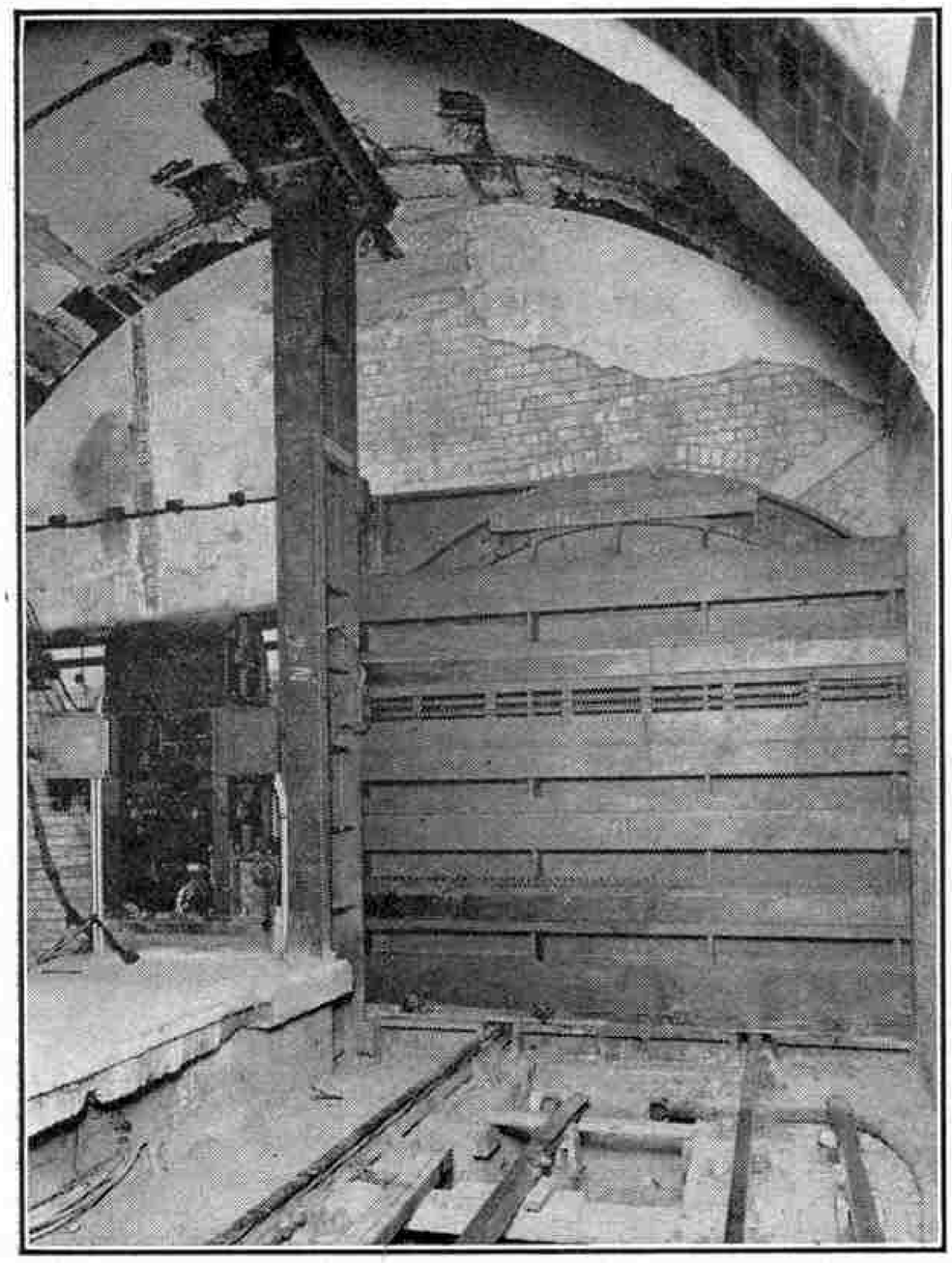
A general view of floodgate without thrust column machinery or general finishings. South end of a south-bound platform.

Sliding floodgates of built-up steel construction, mounted in heavy cast-iron frameworks, are erected against the headwalls of the stations at each end of the sections to be isolated. The gates consist of a circular portion that fits the tunnel mouth, and a reinforcing framework of rectangular form; and each gate has a thickness of 13 in. and a weight of slightly under six tons. When in the open position the gates are located against the station head-walls, and the closing is effected by a horizontal movement along special platforms or sills built across the tunnel mouths at rail level. The motor-operated reduction gear erected on the station platform alongside the gate-frame. By this means the gate can be smoothly and swiftly moved across to completely seal the entrance to the tunnel.

The reduction gear is of a sturdy and very compact form, with the motor mounted above and coupled to the spindle of the first spur gear by an endless chain drive. The whole unit is fitted at the side of a large vertical thrust-column of steel girder construction erected between the platform and the roof of the station tunnel, and serves both to take the operating thrust of the door movement and to provide additional strength for the floodgate and its frame. On one side of this thrust-column is fitted the special switch that transmits a signal indicating the position of the gate to the Traffic Controller's office. The method of actuating this switch is very ingenious. Fitted across the side of the gate facing the station are two rails that are at their highest level at one side, then bend downward and continue across the gate at a lower level, and finally make a further downward curve at the opposite side. An arm projecting from the switch passes between these two rails, and the changing of the rail height as the gate moves



General view from station of tunnel floodgate in closed position, showing thrust-column and machinery.



The floodgate in closed position, seen from the running tunnel.

alters the position of the switch arm and so gives the required signal.

To give every precaution against failure, alternative power supplies are available for the motor, and as a final stand-by measure hand operation is provided for, the gates being moved across by a hand-key of the crank type. The normal time required to close the gate by electrical means is one minute, and the hand operation takes 4½ minutes. Thus either method gives ample time to ensure the safety of the tunnels on receipt of an air-raid warning, even when allowance is made for the clearance of any train that may be in the under-river section.

Before the actual closing of the gates, the gaps in the gate-sill that provide spaces for the rails are filled in by rubber lined steel "sealing-blocks," which are placed in position by the operators; and when these are in place a continuous runway is provided for the gate. After this the starting of the motor by means of a push-switch is all that is necessary to complete the operation. The reverse process takes place when the gates are opened after the "All Clear" signal is received.

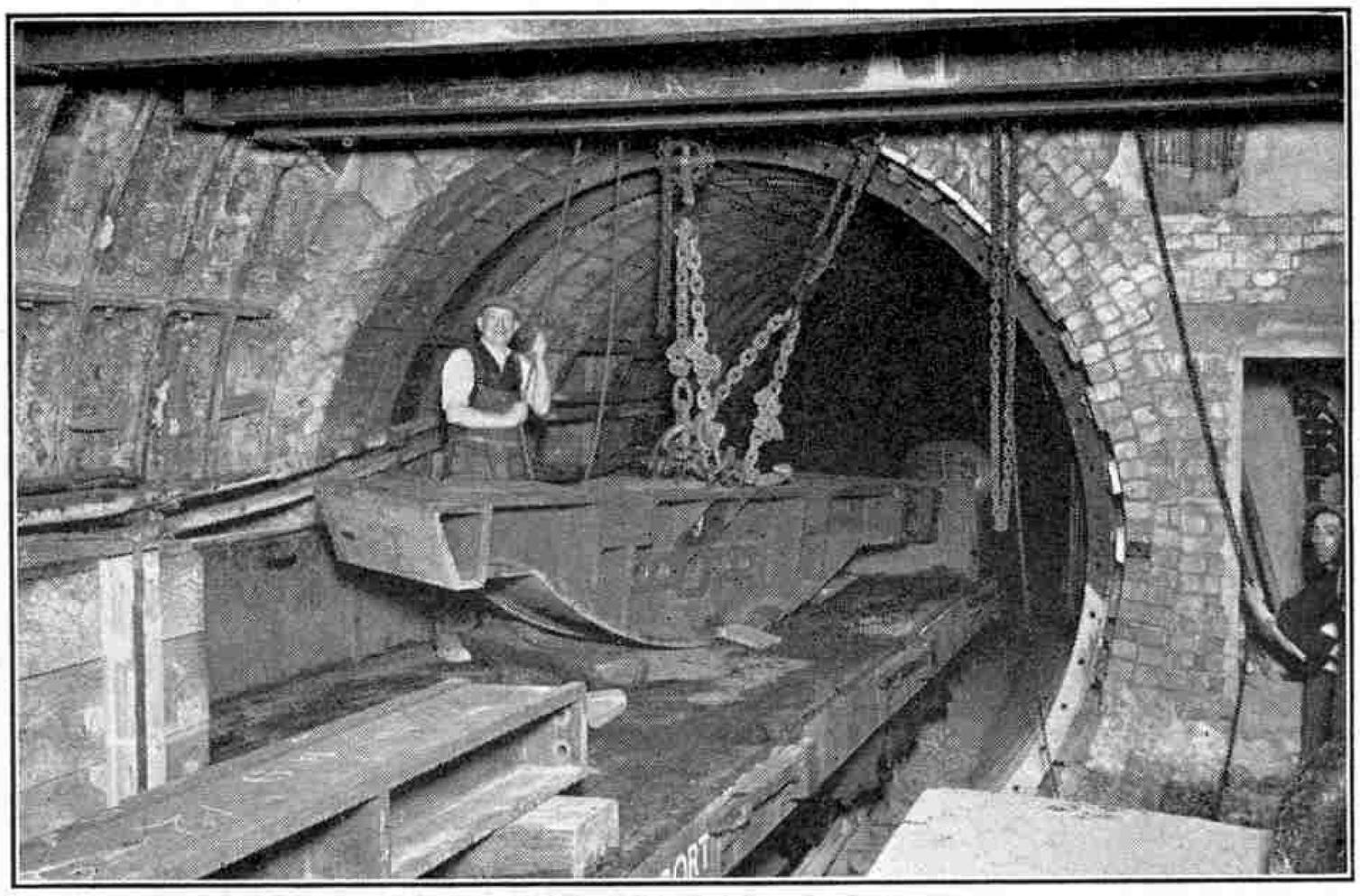
Complete interlocking devices are fitted to prevent the possibility of the gates being closed while a train is still in an under-river section, and illuminated diagrams that indicate the presence of a train in the section are provided in the operators' control cabins beside the gates. The position of every floodgate is shown at all times on special illuminated indicators in the Traffic Controller's office, and it is impossible for a gate to be moved without a definite signal being given to the officials in charge.

The procedure for closing the gates has been worked out to the most complete detail. When an air-raid warning is received at the Traffic Controller's office, special push-switches are operated, and these transmit to the operators' cabins an instruction to close the gates. An alarm bell is rung at each gate, and the word "Close" is illuminated on an indicator panel in each of the control cabins. The operators on duty acknowledge receipt of the signal by pressing push-switches that cause somewhat similar illuminated signals to appear in the Traffic Controller's office, and by checking these it can be made certain that every gate receives its signal and that the operators are carrying out their duties.

The floodgates already installed are at Waterloo and Charing Cross Stations on the Bakerloo line, and at Waterloo and Strand Stations on the Northern line; and each gate has involved a considerable amount of constructional work in a very restricted space. In addition to the erection of the floodgates, frames and operating mechanism, special signal cable ducts had to be provided, and watertight inspection doors fitted in the running tunnels at points beyond the gates.

In view of the fact that the flooding of an under-river section of the tunnels would impose a heavy load on the floodgates, the installations have been given a large margin of safety, each gate being able to resist a force of 800 tons. This is several times greater than any possible pressure that could be set up by water in the tunnel.

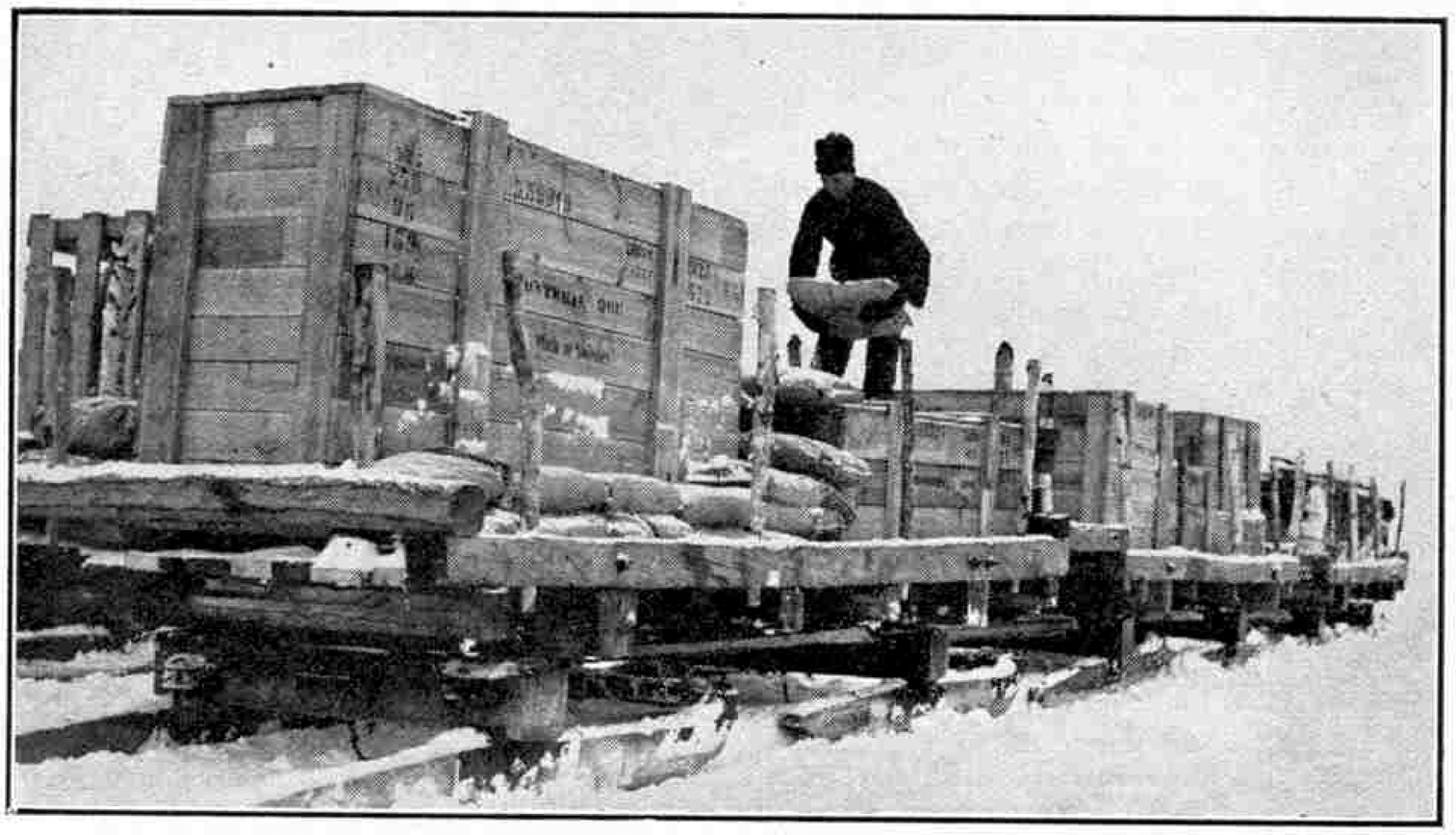
Other precautions on the Underground system are very extensive, for over 50 stations have been fitted with appropriate safety devices. Some of the work called for was extremely difficult, an instance being at King's Cross Station, where every subway entrance was liable to damage from either sewers or water mains. As the distances separating the subways from the mains and sewers did not permit of sufficient strengthening of the structures, the circulating area at the foot of the main escalators was liable to flooding from the sub-surface ticket hall above in the event of damage. The only immediately practicable method of protecting the station was therefore to block up all the four passages leading from the lower circulating area (Continued on page 208)



The cell being off-loaded from floodgate.

Canada's Tractor Freight Trains

By James Montagnes



Loading a tractor freight train in northern Ontario with bags of cement. Boxes of mining machinery are already in place for the 200-mile trek across frozen lakes and through virgin bush.

TRACTORS hauling trains of sleds are the heavy freighters of northern Canada, where new mines are constantly being opened far beyond the railways. Using the extreme cold of northern Canada to advantage, transport operators each winter run tractor freight trains, practically on railway schedule, from the end of steel across frozen lakes to new mining towns rising in the virgin bush.

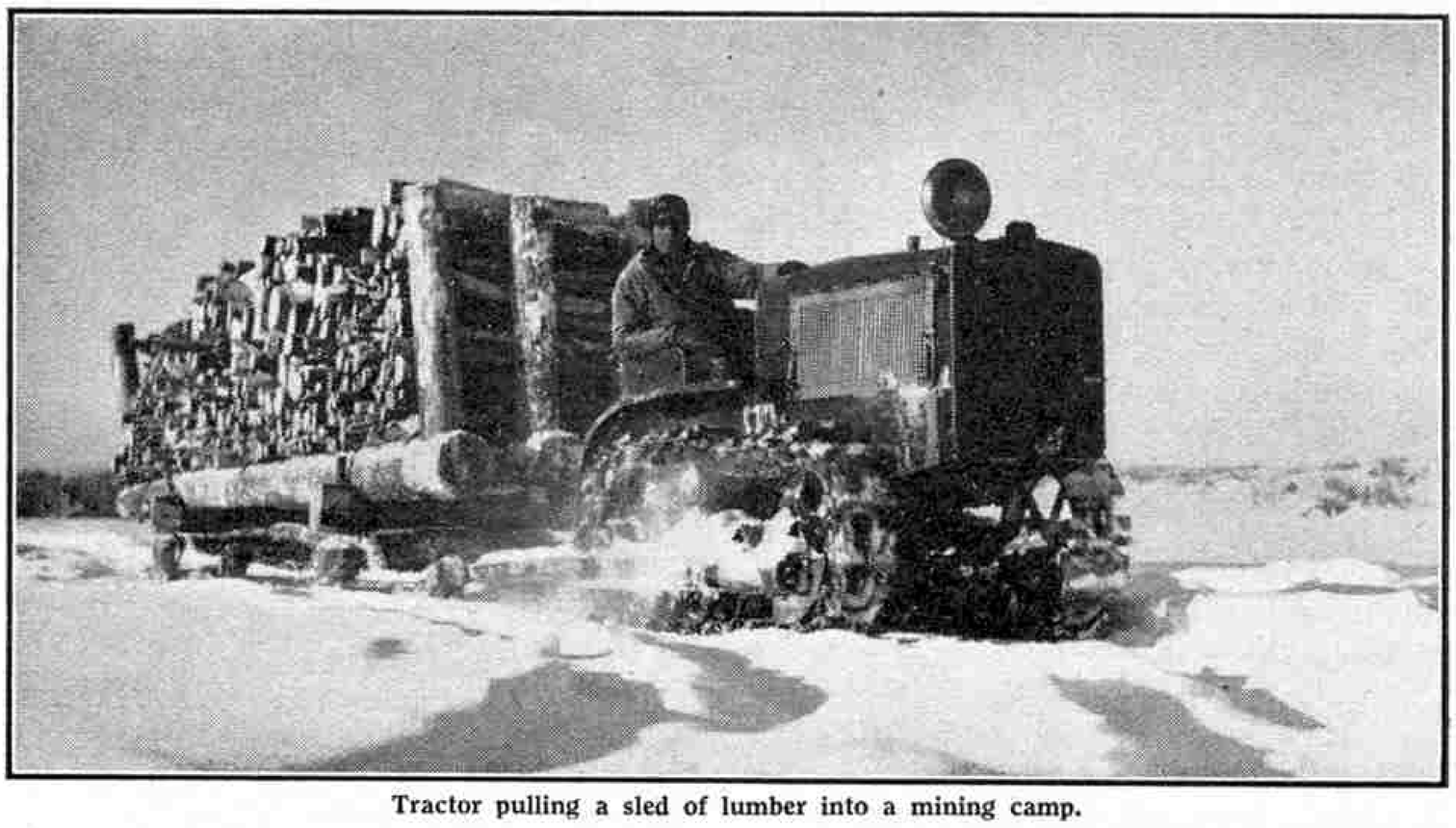
Because it is too costly to lay a railway in northern Canada with its myriad lakes, and because aeroplanes cannot carry all heavy freight and the summer shipping season is too short, tractors have filled a definite need for both short and long hauls. Thousands of tons of mining machinery, lumber, office equipment, food, electrical equipment, are hauled each winter by tractor from the last railway stop. At points like Hudson and Sioux Lookout, in northern Ontario, along the transcontinental railway main line, tons of equipment are unloaded late each autumn and allowed to pile up for the time when the ice, which starts to form early in October, is strong enough to carry the tractors and their trains of three or more loaded sleds.

Forty tons is considered a good load for a tractor and three sleighs, and cavalcades of three or more tractor trains are often seen on the road through the bush. As many as 16 tractors with 60 sleds operate from busy railway stations in the north country. On long hauls a caboose is hitched on to the last loaded sled, where the drivers can keep warm and sleep when not driving. Snowploughs are attached to tractors after severe snowstorms, and so the roads over rocky islands, frozen river and lake are kept open. Where a large order requires constant daily passage of tractors for any length of time, telephone lines are strung along the route, so that a tractor in trouble can easily summon aid.

The greatest hazard of the tractor trains is slush that forms, not on top of the snow, but below the snow. The lakes are covered with 20 to 30 inches of snow; that amount of snow is heavy, so are the tractor trains. These outfits, weighing from 30 to 50 tons and jogging along at a speed of four miles an hour, put additional pressure on the ice, which is already supporting a heavy blanket of snow. The result is that the water below, being incompressible, is forced upward through cracks in the ice and forms in pools on top of the ice, but under the snow. There it remains unfrozen, no matter how cold the weather. When the tractors treads dig into the snow, they bring up that slush which freezes solid in no time. Then the men have to chop that ice away, and the tractor goes ahead a short distance, when the whole procedure has to be gone into again.

In hilly country, of which there is plenty in northern Canada, tractors sometimes have to use a trailer cable to make some of the hills.

Young men run the tractor trains, a tough breed who can take the weather, the cold and the dangers in their stride. They work usually on a six-hour stretch, sleep six hours in the caboose, and go on for another six hours. They sit on well padded seats, but even so the bumps over rough ice hummocks, over rocks and fallen trees, are felt. Sometimes seasickness is experienced by new hands. This bumping and jolting counteracts a tendency to fall asleep caused by the monotonous hum of the Diesel engines. They have to make their engine repairs in temperatures that often hover for weeks around 40 below zero. Frequently they are storm bound when high winds and heavy snowdrifts stop traffic. When they are unable to go ahead on account of engine trouble they lay huge signs of wood on the snow for pilots who fly overhead to see.



Tractor pulling a sled of lumber into a mining camp.

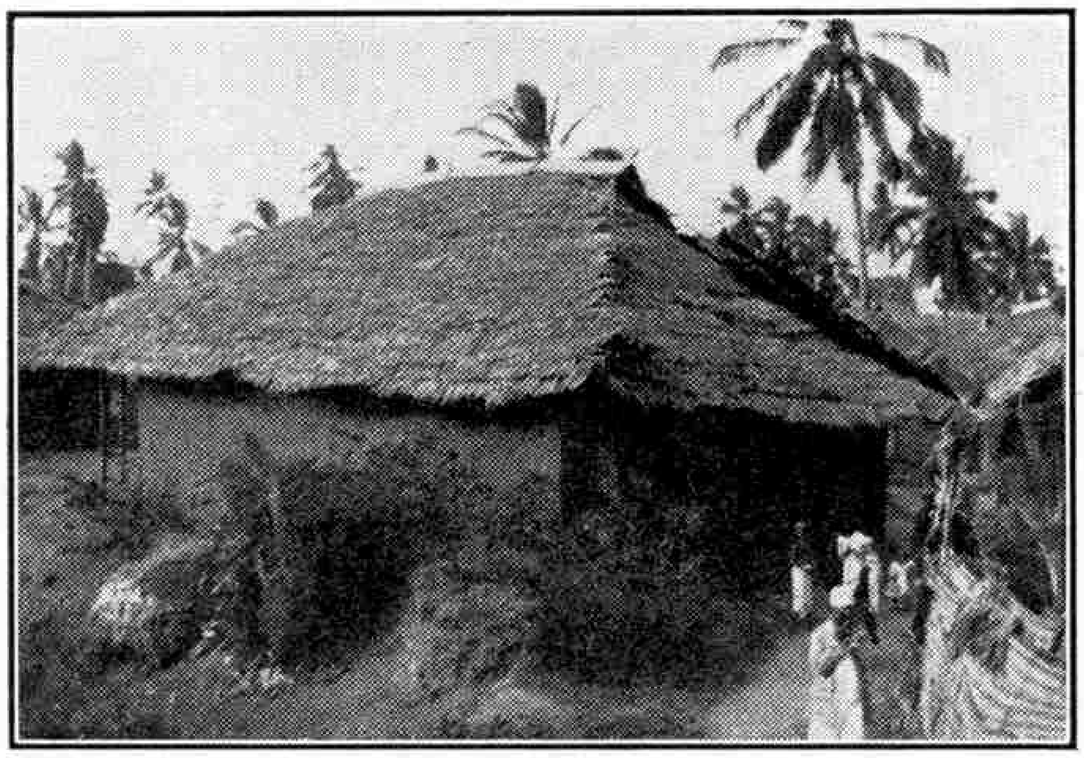
Little Ali of Zanzibar

By Arthur Lamsley

A LITTLE chap was Ali, about five or six years old—a native boy never knows his correct age—and the first coloured friend I made when I went to the island of Zanzibar, off the tropical East Coast of Africa.

It was very curious how we first met. I have reason to believe Ali was the business end of a numerous family. I left my house the second day in the early morning to go to my work, Ali was squatting on my door-step. Seeing me coming down the long, winding stone stairs leading into the Arab courtyard, he jumped up, stood to attention, saluting like a tiny soldier as I went out into the road. He let me get about ten yards ahead, then followed me.

After a few minutes I turned to see if he was still following, but to my disappointment he was missing. I liked his cheery black face and white line of strong teeth, and wondered why he should have singled me out for some special affection. Turning a bend of the narrow road leading to my office, I was agreeably surprised to find little Ali standing at attention, saluting, by the steps of the door. He had run round a shorter way, and his quick legs had brought him to my office in time to prepare himself for giving me another welcome. This time I determined to speak to him as best I could in Swahili, the native language.



Ali's Home in a Swahili Village.

But Ali was too quick for me. As I approached the door he smiled and spoke first. "Good morning, white man," he said in his own tongue.

"Well, what can I do for you, little man?" I asked, making sure his attention to me meant that he wanted something.

Making a very wry face, and holding his stomach, he told me he felt very empty, and wanted some food to fill him up.

I laughed at this, but Ali still kept his distorted and anxious face. He was a supreme actor, and doubtless had well rehearsed his part in the bush before he came, believing that in me he would have a kind audience.

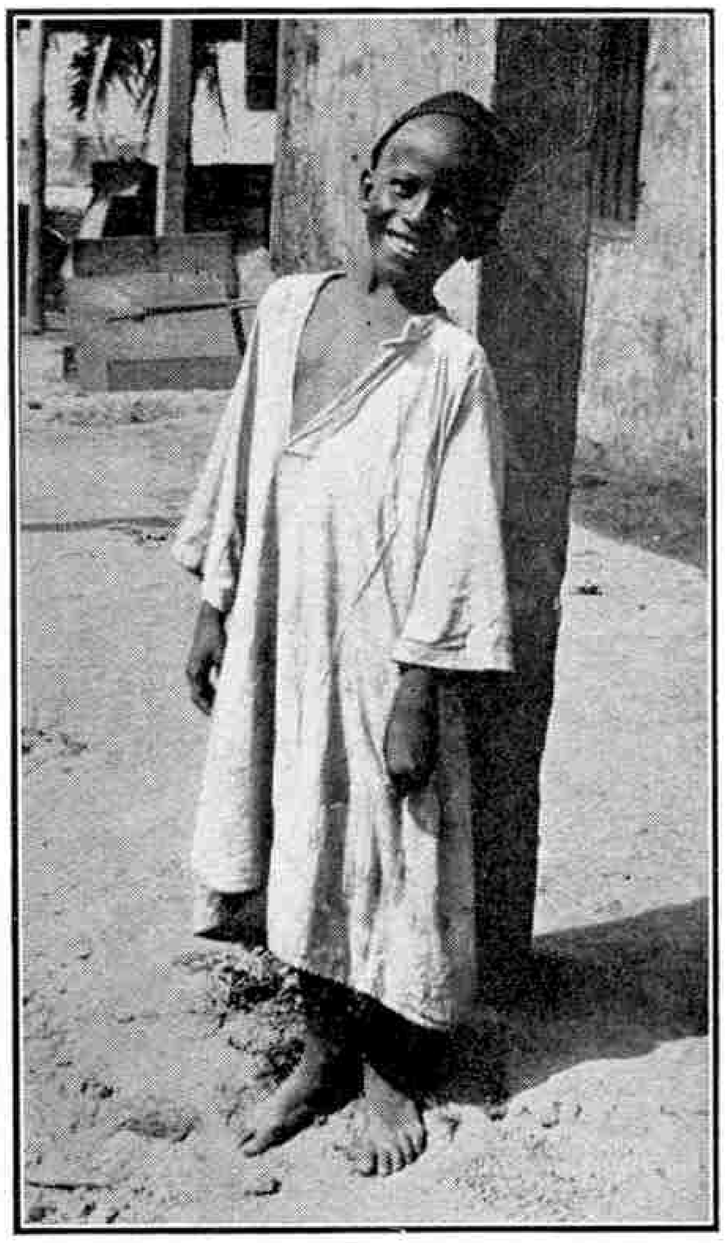
Seeing me put my hand in my trouser pocket, Ali's face suddenly beamed delight, and with a flash of white teeth he smiled as only native boys can. Holding out both hands to receive what I was pulling out of my pocket, he looked a bundle of mischievous happiness.

I gave him two pice—a pice being the native copper coin in those parts and worth an eighth of an English penny. Already I knew a pice could buy a native enough for a meal, but I thought his acting deserved two pice.

Saluting again, Ali ran away, not to the market place to spend his pice, but towards the bush, where I imagined he lived.

Next morning Ali was at his post again as I came from my house, and he repeated the same wry face, and patted his stomach, telling me it was "still empty."

This happened every morning for nearly two years, Sundays and week-days; and towards the end of my stay I increased Ali's pice to four and sometimes eight per day, which, after all, is not very much in our English currency, and would represent seven-pence a week. In Zanzibar, however, this sum would buy a considerable quantity of food of a type eaten by the natives.



Little Ali, of Zanzibar.

He and I used to have little chats. I found out that he did not think much of school, but wanted to be free. He told me that when he was a bigger boy he would work on a shamba (farm) till he was strong enough to sail in a Dhow, and be "free on the sea." He will probably end up as the skipper of a Dhow.

It was not until a week before I returned to England that I learned what Ali did with the pice he begged from me each day. I insisted on going with him to see his father and mother in the bush, and he seemed delighted, chattering all the way through the bush trail to his hut.

Ali ran ahead as we came to a clearance in the bush, and I heard him greeted by a chorus of children's voices, which ceased immediately I appeared upon the scene. Surrounded by the six other brothers and sisters, Ali put the pice into his mother's hand, and she patted him on the head in a blessing of thanks.

This little black chap, although too young to work, yet knew his mother had a big task to feed all his other sisters and brothers. So he attached himself to a white man, and the money he got each day by pleading that his little stomach was empty helped to feed the rest of the family.

Little Ali, with his ingenious affection and tricks, was a supreme lesson in unselfishness and love.

ENGINEERING NEWS



A Scammell trailer type fire-fighter in action. A description of the trailer appears on this page.

A Three-Wheeled Fire Engine

One of the most novel types of fire engine now in service is the three-wheeler vehicle of the type commonly known as the mechanical-horse shown in the lower illustration on this page. It is a product of Scammell Lorries Ltd., Watford, and was constructed for service at a large steelworks. A vehicle of this kind is particularly suited for operation in a works as it can be manœuvred in awkward places more easily than one with four wheels.

The unit shown carries a 350-gallon tank. The pump has a capacity of 50 galls. per min. at a pressure of 50 lb. per sq. in., and a control valve is fitted that permits water to be pumped and delivered from the tank, from an external source such as a hydrant or pool, or directly into the former from the latter. In addition to the vehicle pump, a portable self-contained fire-fighting set is carried at the rear. Included in the equipment are two hose reels, an extensible ladder and suction hose, while two rows of seats for the crew are provided beneath a steel canopy.

Another example of Scammell fire-fighting equipment is shown in action in the upper illustration on this page. It is a heavy duty trailer pump, specially designed to meet the requirements of the Home Office A.R.P. Emergency Fire Brigade Organisation, and it is the most powerful of its type and weight yet produced. The pump is driven by a Scammell four-cylinder engine of 57 b.h.p., and is capable of delivering from 345 to 530 galls. per min. at pressures varying from 150 to 60 lb. per sq. in. respectively. The complete pumping unit is protected from the weather, dirt and dust by a removable light steel cowling, which is fitted with detachable side panels and held in place by spring-loaded clips.

New Warships for the French Navy

The French Minister of Marine recently announced that France's great new 35,000-ton battleship "*Richelieu*" will be ready for service after June next. The armament of this ship is stated to include eight 14 in. guns and fifteen 6 in. guns. There are also eight 37 mm. and ten 13 mm. anti-aircraft guns.

Accounts appearing in the French press state that three other 35,000-ton battleships, two 18,000-ton aircraft carriers, three 8,000-ton cruisers and 15 destroyers are at present under construction in that country, in addition to submarines and submarine minelayers.

Belt Conveyor 9½ Miles Long

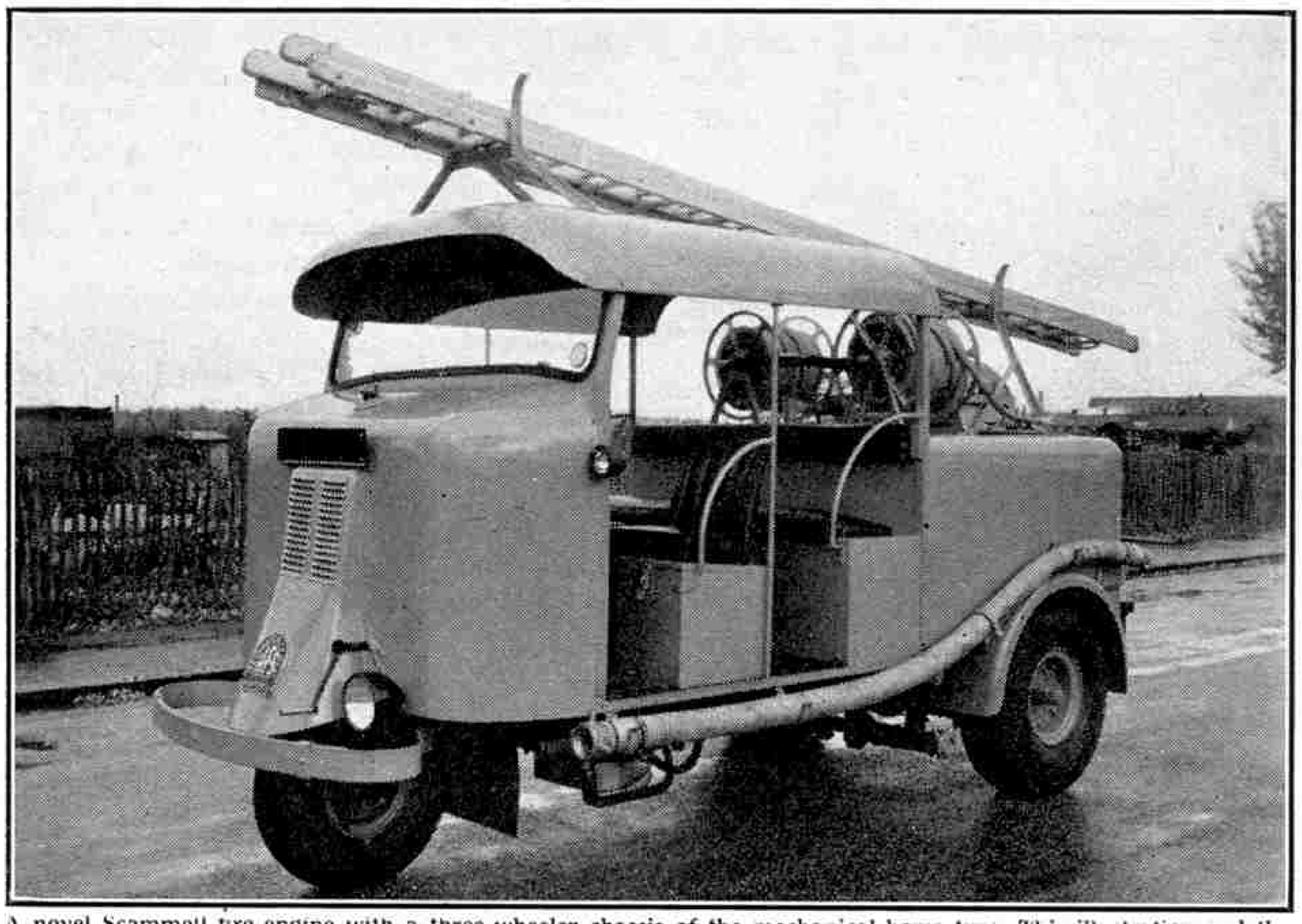
A belt conveyor 3 ft. wide and over 9½ miles long is now being built in the United States, where it will be used for the transport of sand and gravel over desert country to the site of the great Shasta Dam. The conveyor will run from gravel pits at Redding to Coram, California. It is being constructed by the Goodyear Tyre and Rubber Company for the Columbia Construction Company Inc., and about 20 miles of six-ply cotton rubber-covered belting 3 ft. wide and weighing approximately 670 tons will be required. This will be installed in 26 endless units, transfer of material from one unit to another being made by means of steel chutes.

The line of the conveyor will follow roughly the general contour of the rolling desert it has to cross, and at its starting point will be at an elevation of 490 ft. It will then rise to traverse a mountain pass and at its highest point will reach an altitude of 1,450 ft. From this point it will descend 800 ft. to its northern terminal.

The conveyor will be erected on wooden supports varying in height above the ground from four to 90 ft. and will run on 12,500 steel troughing idlers.

Each of the 26 units of the conveyor will be driven by a 200 h.p. electric motor, except the three most northern units. As the latter will be on the down grade the weight of the descending material will make these belts self operating.

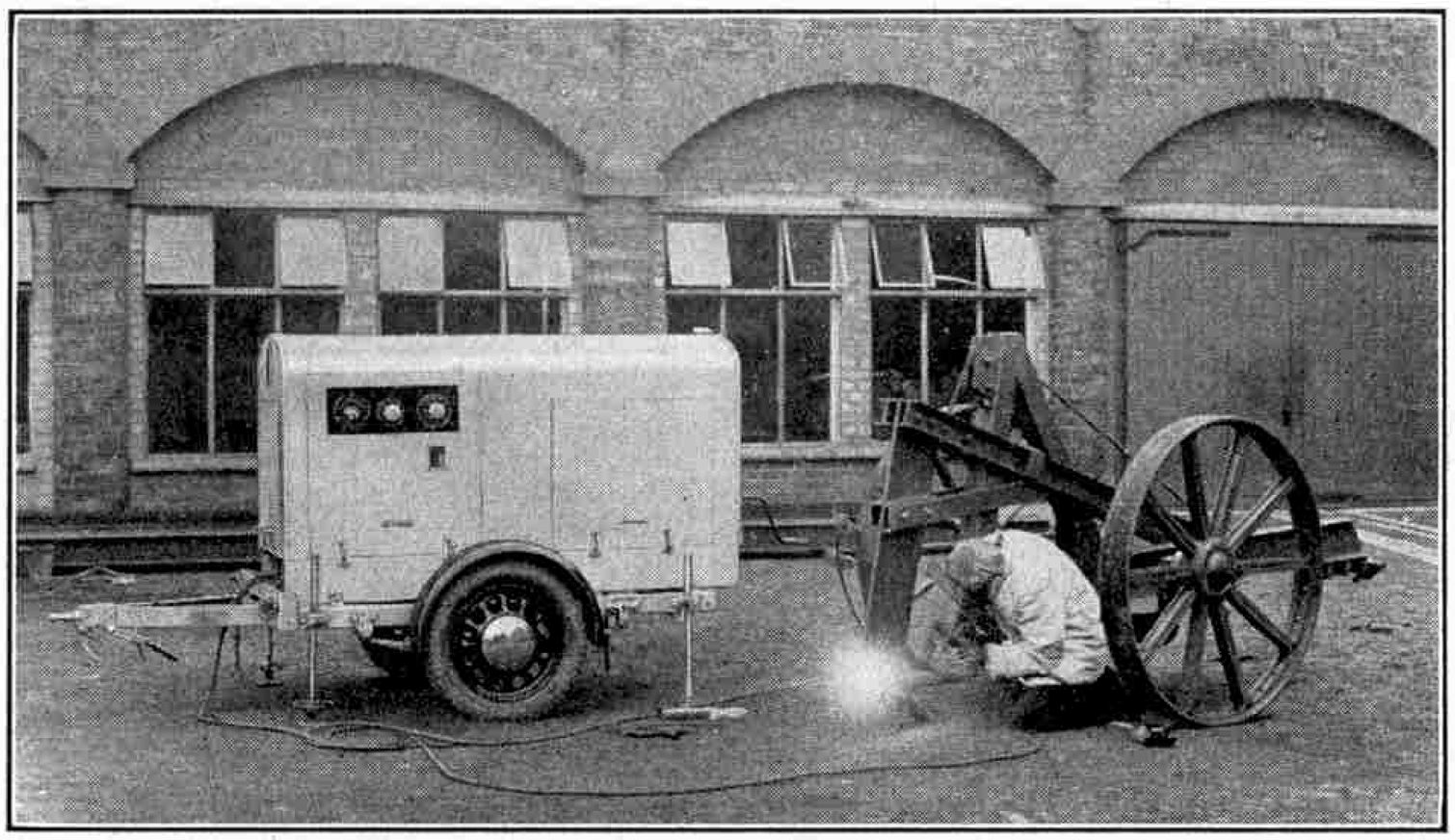
The complete conveyor will be able to carry 1,100 tons of material an hour and will travel at a speed of 550 ft. per minute.



A novel Scammell fire engine with a three-wheeler chassis of the mechanical-horse type. This illustration and the one above are reproduced by courtesy of Scammell Lorries Ltd., Watford.

The World's Largest Collection of Anchor Models

The National Maritime Museum, Greenwich, now possesses the largest and most complete collection of ships' anchor models in the world. The total number of models is 106. Each is of a distinct type, and collectively they tell the story of anchor-making from the earliest "pickaxe" type to the modern stockless anchor.



A welder at work with a portable arc welding plant owned by the River Ouse (Yorkshire) Catchment Board. Photograph reproduced by courtesy of The General Electric Co. Ltd.

Portable Arc Welding Plant

There is considerable scope for the use of electric arc welding in the construction and maintenance of the very wide range of plant and appliances that are employed by a river catchment board. The upper illustration on this page shows a very convenient portable electric welding equipment for this class of service. This was manufactured by The General Electric Co. Ltd., for the River Ouse (Yorkshire) Catchment Board. It includes a direct current generator driven by a Ford petrol engine, together with suitable control and regulating gear. The whole of the equipment is mounted on a strongly constructed chassis provided with two pneumatic tyred wheels, and the springing is such as to permit towing by a light motor truck on any reasonable road surface.

The generator is rated for continuous welding duty at 300 amperes 25/70 volts, and is controlled by means of regulators mounted in a handy position above it. The engine develops 24 h.p. and is directly connected to the generator through a flexible coupling. The radiator fan is arranged so that it draws air from the generator and discharges it to the outside. This avoids passing hot air from the radiator through the generator. The whole of the equipment is enclosed in a sheet steel weatherproof housing fitted with removable panels.

Acknowledgment is due to H. J. Paul, Esq., M.Inst.C.E., M. Inst. W.E., Engineer to the Board, for permission to publish the above information and illustration.

A Fine Danish Oil-Tanker

One of the most notable ships recently completed in Continental dockyards is the oil tanker *"Saturnus,"* which was built in Denmark for the Swedish firm Rederiaktiebolaget Saturnus of Stockholm. The *"Saturnus"* is a single-screw ship propelled by Diesel engines, and has a deadweight carrying capacity of 15,000 tons and a loaded service speed of 14 knots. Of typical tanker design, the *"Saturnus"* has been constructed to meet the requirements of the highest classification at Lloyds Register of Shipping, and her well-raked stem and conical cruiser stern, give her a very smart and efficient appearance. The vessel has a length of 485 ft.

A Famous Shipping Line attains its Centenary

The Pacific Steam Navigation Company recently celebrated the centenary of its foundation, its first charter having been granted in 1840. The first sailings of the Company were carried out by two 700-ton ships, the *"Chile"* and the *"Peru,"* which voyaged from London to West Coast ports of South America. It is from this small beginning that the Company has risen to its present eminent position. The largest ship owned by the Company to-day is the *"Reina del Pacifico,"* of 17,702 tons gross. Part of the centenary celebrations consisted of an exhibition at Liverpool, the headquarters of the Company since 1845, of prints and documents covering 100 years of steam navigation.

The Spencer (Melksham) Sack Stacker

In our reference to the 40 ft. Sack Stacker manufactured by Spencer (Melksham) Ltd., which appeared in the *"Engineering News"* pages of the March *"M.M.,"* it was inferred that the sacks are transported in this machine by means of a continuous conveyor belt. Actually the conveyor is in the form of a continuous roller chain fitted with steel bar attachments by which the sacks are carried.

The Antarctic Snow Cruiser

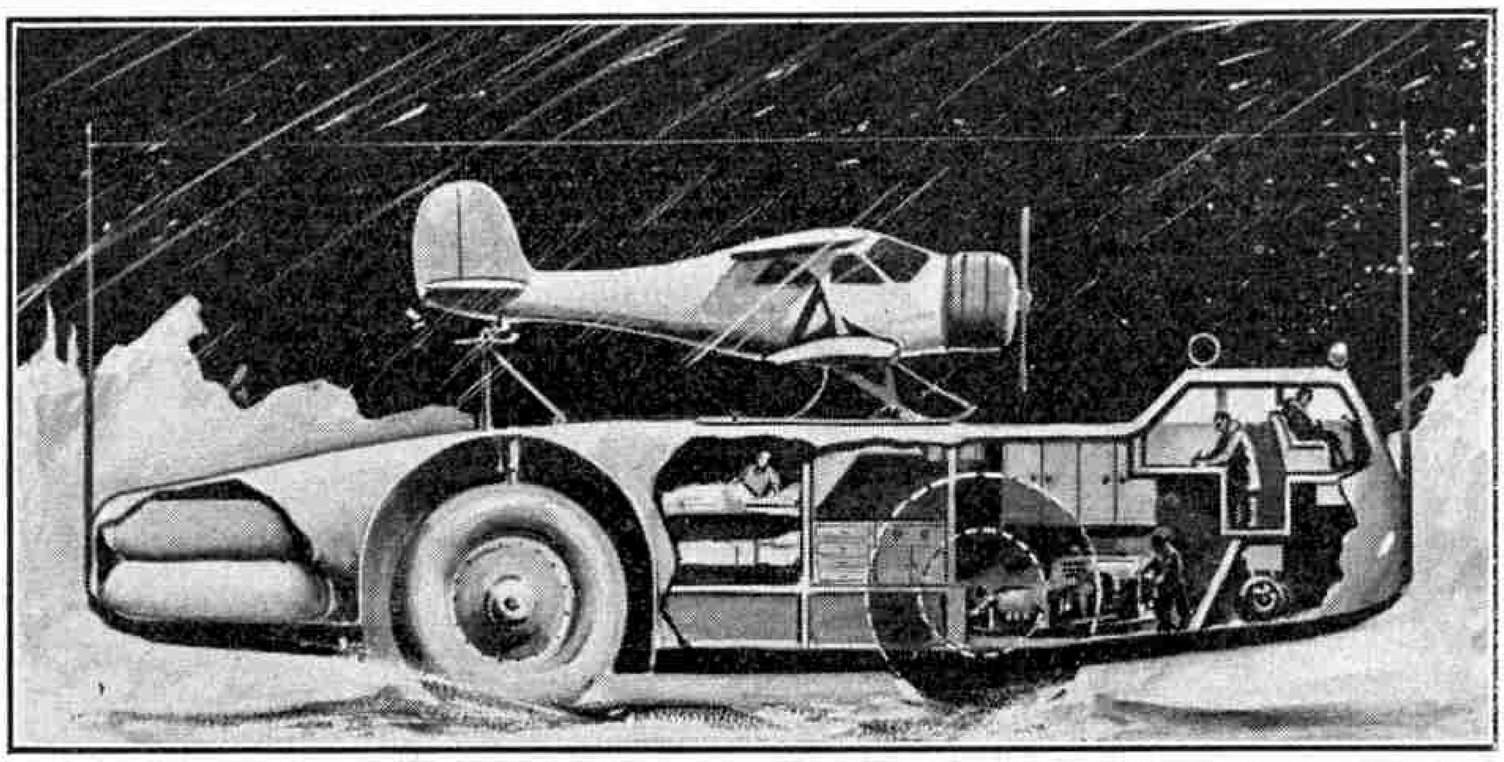
The lower illustration on this page shows a giant Diesel-engined vehicle 55 ft. long that is now being built at Chicago for use in an expedition to the South Pole organised by the Government of the United States. It is known as the Antarctic Snow Cruiser and is a unique self-propelled vehicle equipped with a scientific laboratory and able to carry a year's supply of provisions for a crew of four men. On its upper deck it carries an aeroplane, which will make it possible to explore a strip of territory 600 miles wide, and allow the crew to map in one month more territory than all previous expeditions combined have done.

The Snow Cruiser is mounted on four wheels, independently driven, and is capable of crossing crevasses in the ice up to 15 ft. wide. It has a cruising radius of 5,000 miles.

In the design and construction of the vehicle every effort has been made to obtain the strongest possible structure with least possible weight. High tensile steel structural members are used and they are fused together by the modern shielded arc process of electric welding, using the most recent Lincoln welding equipment and special Lincoln electrodes developed particularly for welding high-speed steel. If riveted construction had been employed, it is estimated that the weight would have been at least 30 per cent. greater.

Arc welding will also be an important adjunct to the polar vehicle's permanent equipment, for a Lincoln arc welding generator of 200-ampere capacity will be permanently installed, together with a kit of Lincoln arc welding electrodes. This plant will be a necessary tool for the Cruiser's machine shop, where it will be used for repairing broken or worn machine or structural parts and in the fabrication of miscellaneous devices and equipment. In addition it may be used for charging batteries, supplying current for lighting and starting the Snow Cruiser's engines.

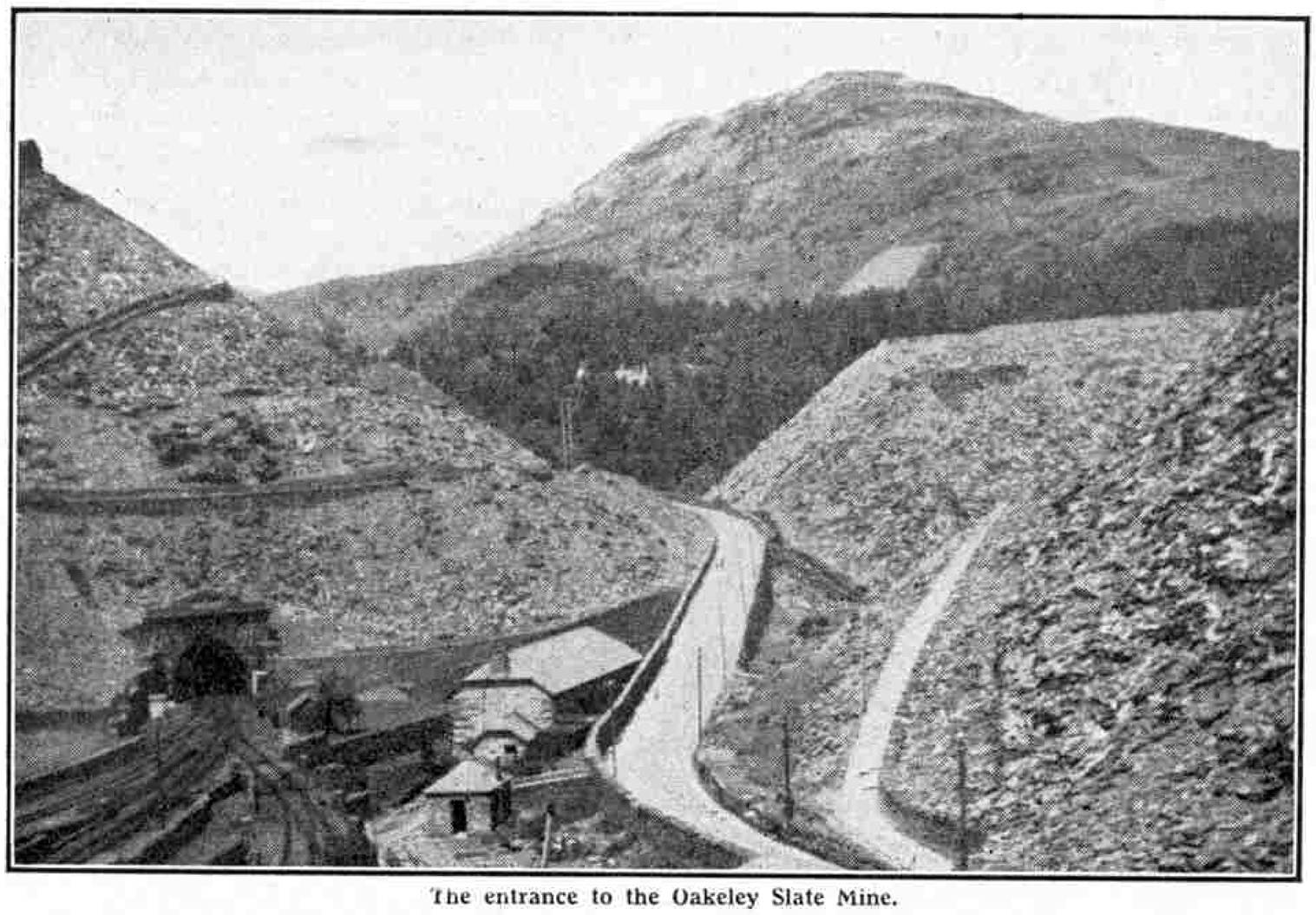
This unique vehicle was designed by the staff of the Research Foundation of Armour Institute of Technology, under the direction of Dr. Thomas C. Poulter.



The Antarctic Snow Cruiser described on this page. It will be used in an expedition to the South Pole organised by the United States Government. Photograph by courtesy of Lincoln Electric Co. Ltd., Welwyn Garden City.

* * * *

The furnaces of a new power station to be built at Yzran in Russia will be fired by shale from the Kashpir mines. The shale will be burnt in the form of dust, the slack running off as a liquid. The slack will then be converted into building materials.



The entrance to the Oakeley Slate Mine.

The World's Largest Slate Mine

By Sydney Moorhouse, F.R.G.S.

HAVE you ever travelled from Bettws-y-Coed, in North Wales, up the romantic Lledr Valley, where a lively river frolics among the colourful woodlands and the purple mountain slopes close the dale on either hand, to Bleanau Festiniog, the town of slates? I went that way not long ago when I was making for the Oakeley Slate Mine, the largest slate mine in the whole world. I must confess that, as I looked out of the railway carriage windows and saw the tip of mighty Moel Siabod thrusting itself into a cloudless sky, I almost wished that I was going to spend the afternoon in climbing that soaring peak instead of wandering underground through a succession of dark, damp galleries and passages.

Alighting from the train at Bleanau Festiniog I saw huge slate mountains, covered with piles of debris and broken slates, surrounding the town on every side. Even the walls of the houses seemed to be composed of slate, the causeways were of the same material, and I even saw slate "posts" doing service as clothes posts in front of one or two houses. From this you will realise the general impression that Bleanau Festiniog gives to the visitor.

To reach the office of the Oakeley Slate Company I had to climb up a steep path that rose over great piles of debris. It seemed as though the very heart of the mountain had been torn out and ruthlessly scattered about its flanks. It is estimated that as much as twice to twenty times the quantity of slate that is actually used becomes waste, so that it will be realised how much these slate mountains grow every year. The top of the path brought me to a miniature plateau with numerous huts, sheds, railway lines and telephone wires, among which was the office. Close at hand was a first-aid room.

At the office I was met by the guide, who promised to show me the whole process of slate making, right from quarrying the raw slate to the finished product.

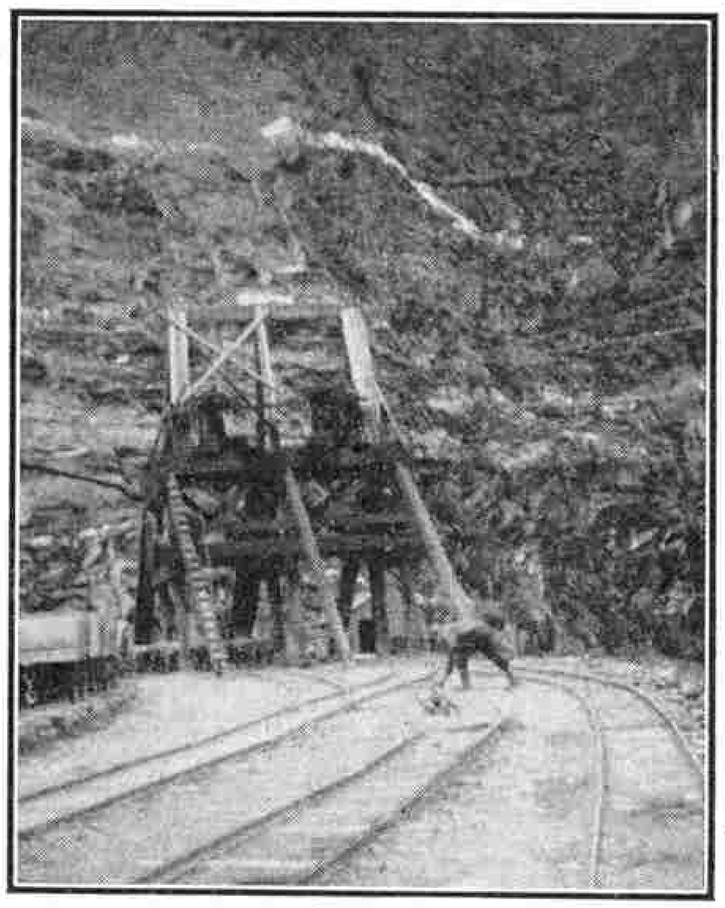
I was taken over more heaps of slate, and then we came to the top of a long steep incline up and down which a succession of little trucks ran. Those coming up were heavily laden with huge pieces of slate; those going the other way were empty. "Jump into one of these," my companion instructed, and soon we were clattering down towards a huge platform hewn out of the mountain, on which rails ran in all directions and there was a weird assortment of wires and cranes.

I followed my guide to the edge of this rocky platform and then looked down into an immense cavern, some 300 ft. below. This was the mine proper, and the entrance was made by standing on a platform which, working on racks, slides downhill at an angle of 45 degrees, and comes to a stop at the top of a deep pool of water.

While we were waiting for an opportunity to descend I was given some interesting figures concerning the extent of this huge slate mine. The underground passages extend for many miles underground, and to walk round the entire mine and visit every portion would take three or four weeks. Of course not every portion is working at the same time, but at the time of my visit there were 850 men employed at the Oakeley Mine. There are six different levels being worked, the lowest of these being about 1,500 ft. below the surface of the mountain; and in all about 100 chambers are in operation. Each chamber is connected with the next one, and there is an intricate system of bridges and steps linking one level with another.

The men work in groups of four, two being engaged in the actual quarrying while their partners work in the dressing sheds, preparing the slate that has been quarried and sent to them by the others of their group. During a single day such a group may produce about one ton of finished slates and deal with four tons of waste rock.

By this time we were ready to step off the sliding platform. "Mind your head as you go along these passages," called out the guide. I obeyed instinctively. I have had much experience of wandering about caverns and potholes in Yorkshire and the Peak District, and I guessed that slate would be even more



At the Sliding Platform.

immovable than stalactites and stalagmites. We walked down several hundreds of steps and then came to a pause on the brink of a fearsome-looking pit. "There's a deep pool of water down there," I was told, "and pumping engines have to be constantly at work to keep the mine from flooding." Later I was shown the five pumps, each of which pumps about 12,000 gallons of water daily from the depths of the mine.

Still proceeding through the dense grey gloom, we came at length to one of the chambers where work was proceeding and where men were engaged on the slate face. Some of these faces are anything from 100 ft. to 150 ft. long, and 30 ft. wide, and to work on them is an intricate job. Nowhere is there sufficient foothold for even the most intrepid mountaineer, and the surface is always both wet and slippery. How on earth then, you will ask, do the men manage to work these huge slabs? First of all a chain is fixed to the top of the rock, and the workmen, who wear heavily nailed boots, are anchored by the thigh to a knot in the chain, and are thus able to move from side to side and work with pick or portable drill.

From another chamber came a series of miniature explosions and, still following my guide, I watched two men at work with pneumatic drills. Most of you will have heard the noise that these drills make when they are working in the streets of your own town or city, but in the depths of the Oakeley Slate Mine I *felt* rather than heard the shattering. Later I tried to handle one of these drills myself, and I declare that every muscle in my body twitched and my teeth chattered alarmingly!

This drilling precedes the actual blasting. The hole is charged with either gunpowder or gelignite, a fuse is laid, and the hole is then packed with slate fragments and dust. When the charge is fired the whole mountain quivers, and the great pillars and masses of slate come hurtling down. The next process is to split these pillars and blocks into pieces of suitable size to be transported to the dressing rooms up above, and it is at this stage that so much of the waste is made. One miner told me that a cubic yard of slate weighs about 34 cwt. It would be interesting to know how much waste slate would have to be removed before one came to the natural mountain surface!

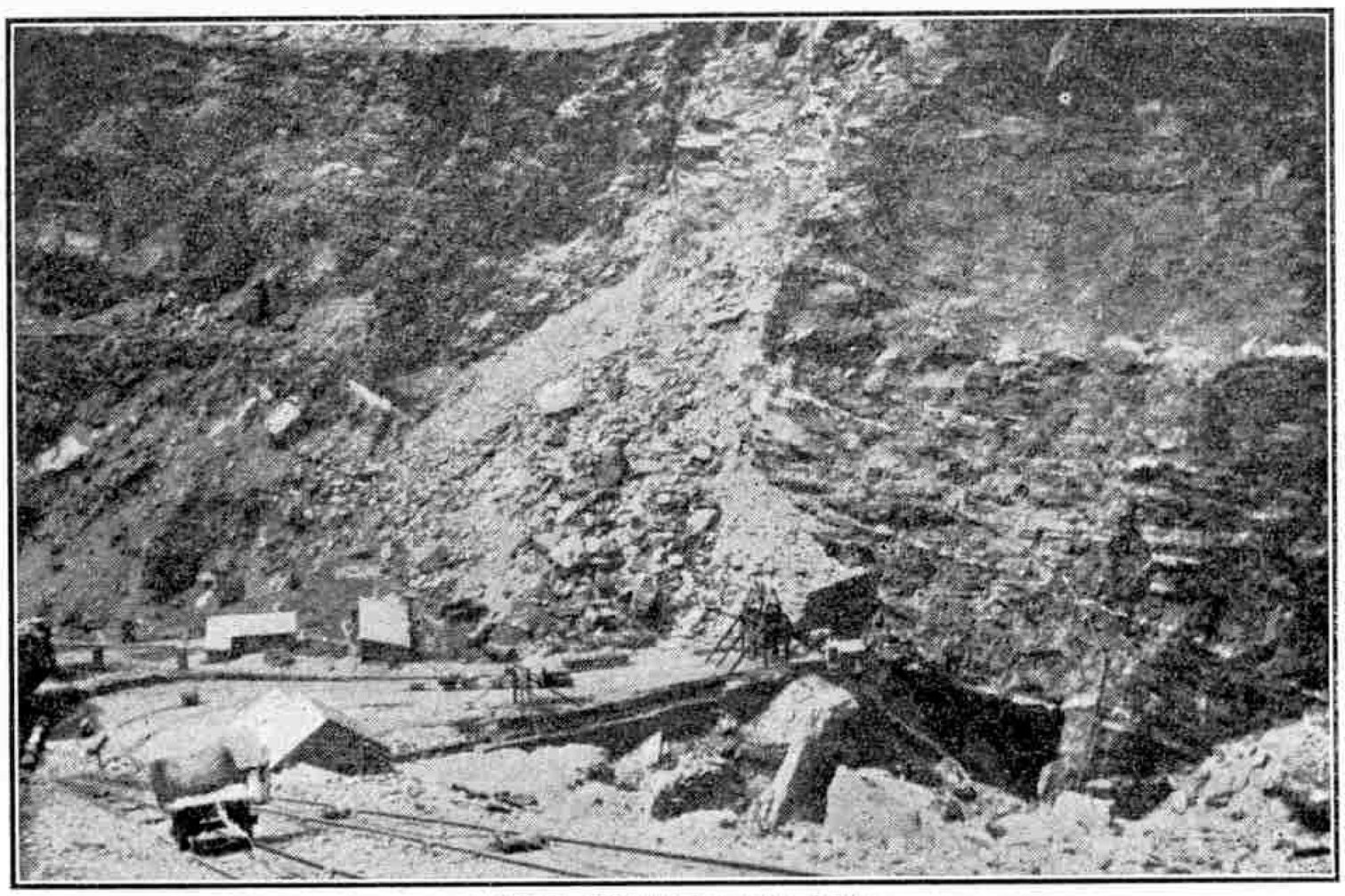
Every afternoon, when the workmen have left the chambers, the "securers" examine the roofs in order to make sure that blasting and other operations have not left the place in an unsafe condition. Long lengths of ladder are necessary for this, and it is essential that these ladders shall touch neither roof nor walls, or there would be danger of causing loose rocks to tumble and perhaps bringing about the collapse of the entire roof. The ladders, often 120 ft. or so in height, are placed on end in the darkness, and workmen hold them tight, like the masts of a ship, with ropes. If the securer wants to examine either side he gives instructions to the men working the ropes, and the ladder heels over until his objective is reached.

Along further grey passages I followed the guide, and then we came to the steps leading to the moving platform and once more looked up through the coiling smoke to the sunlight. The sight of it dazzled my eyes for quite a while. Up the incline we went, and then crossed over to the foot of the incline up which the trucks made their way to the working sheds. My guide was not devoid of a grim sense of humour. "I've seen one of these trucks break away when nearly at the top and crash down to the bottom and be shattered like matchwood," he informed me! The next minute we were travelling in one of these, but no accident occurred, and we now made our way to the dressing sheds where we saw craftsmen engaged in surely the most intricate work of all.

Slate is the only stone that can be split longitudinally into smooth flat layers without in any way decreasing the hardness of the original block, and to see an expert at work is a fascinating experience. Taking a piece of slate one inch thick, he places a chisel on the edge of the slab, gives a few light taps with a mallet, and in no time he has pressed a slate from the slab. It is possible to obtain nine of these slates from one slab, but actually one-sixth of an inch in thickness is usually regarded as the minimum.

The slates are next squared and trimmed by means of a hand machine consisting of two blades arranged like a guillotine, and then the finished slates are despatched for use in building purposes, for billiard tables, and for vats for chemicals. One branch of the industry, however, is dead, and that is the making of slate pencils and writing slates for use in schools. At one time this was quite an important sideline.

Even the waste slate has its uses, but not sufficient can be utilised to prevent some being stacked on the mountain slopes. Some waste slate is ground into dust and used in the making of weather-proof road-surfacing material; and slate flour is used in making face powders for young ladies! It will, of course, be a long time before the dumps of waste slate will disappear from the slopes of the Welsh mountains, but the craze for beauty culture is having its effect. Little does the modern flapper realise that when she puts the powder on her face she is contributing towards the cleaning-up of the debris outside the Welsh slate mines.



Looking down to the mine proper.

RAILWAY NEWS

This Month's Cover

"South for Sunshine" says the Southern Railway, and our cover illustration this month, which is based on a photograph kindly supplied by the *"Southern Railway Magazine,"* shows a typical sunny scene on that most interesting S.R. main line, the section that runs westward from Salisbury to Exeter and Plymouth. The actual spot shown is near Templecombe, in "smiling Somerset," a place of railway interest on its own account. Templecombe is an important junction, for here the Somerset and Dorset Joint line connecting Bath and Bournemouth passes under the S.R. main line. A connecting spur runs from the S. and D. line into the S.R. Station, but the layout is such that all trains on the S. and D. line calling at Templecombe have either to reverse into or out of the station.

L.N.E.R. Locomotive Notes

The last Hull and Barnsley 0–6–0 tender engine, No. 2409, has been broken up after a long period in Darlington Works yard. The Hull and Barnsley system was absorbed into the former N.E.R. before the general grouping of the railways. It was a largely industrial freight line in East Yorkshire and possessed a considerable number of domeless locomotives.

Ten of the former N.E.R. three-cylinder 4–6–0 mixed traffic engines of class B16 are being rebuilt. They are being given new boilers with round topped fire-boxes, and Walschaerts gear incorporating the Gresley motion for operating the inside cylinder. Some of the class "J 27" 0–6–0 goods engines, also of the former N.E.R., are receiving standard L.N.E.R. "J 39" boilers providing greater heating surface.

The "Royal Engine No. 1" of the Great Eastern section, No. 8783 of the newest or "super-Claud Hamilton" "D 16" 4–4–0 class, has been rebuilt at Stratford Works to the handsome new standard for the type, with round topped fire-box and raised frames. She continues to be painted green, with a white roof to the cab and other embellishments. "Strangers" now dealt with at Stratford as necessary for repair are from the Midland and Great Northern Joint stud from East Anglia. Many of these engines, now included in L.N.E.R. stock, are elderly and of distinctly Midland flavour. Ex-Metropolitan Railway extension line tank engines also are now shopped at Stratford. They include some fine modern engines of the 0–6–2, 4–4–4 and 2–6–4 wheel types that have been renumbered L.N.E.R. 6154–7, 6415–22 and 6158–63 respectively.

Some of the two-cylinder 2–8–0 Great Central section mineral engines are being modernised as required by the provision of Doncaster Boilers of 5 ft. 6 in. diameter in place of the Gorton 5 ft. type. The change provides 417 sq. ft. more tube heating surface, and an increase in superheater area from 242 sq. ft. to 400 sq. ft. These locomotives are of the "04" class, of which there are more than 400, including many constructed under Government auspices in 1917-9 and well known as the R.O.D.'s on account of their extensive employment by the Railway Operating Division of the Army during the Great War. A series of them is in reserve for service again.

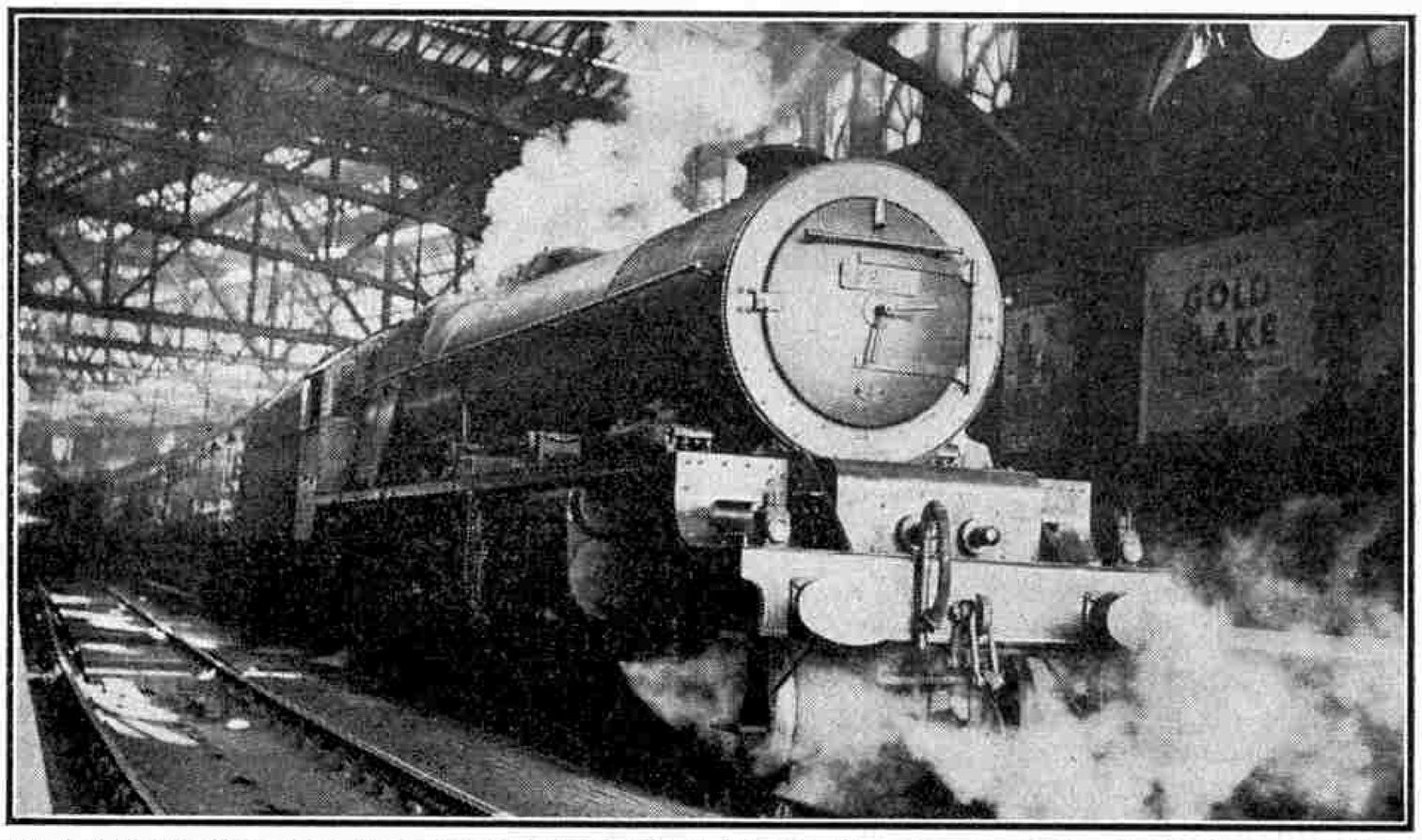
More than 90 "Green Arrow" 2–6–2 engines are already in service and many more will follow. No less than 15 are stationed at King's Cross shed at the time of writing. The "K3" three-cylinder 2–6–0's previously there, which hauled the heaviest express goods trains and shared mixed traffic duties of all kinds from that depot, have been moved to the provinces. Further "V3" 2–6–2 tanks of the new "390" series, with the higher boiler pressure of 200 lb. per sq. in., have been turned out from Doncaster for the Newcastle–Middlesbrough fast passenger services.

An Important Government Order

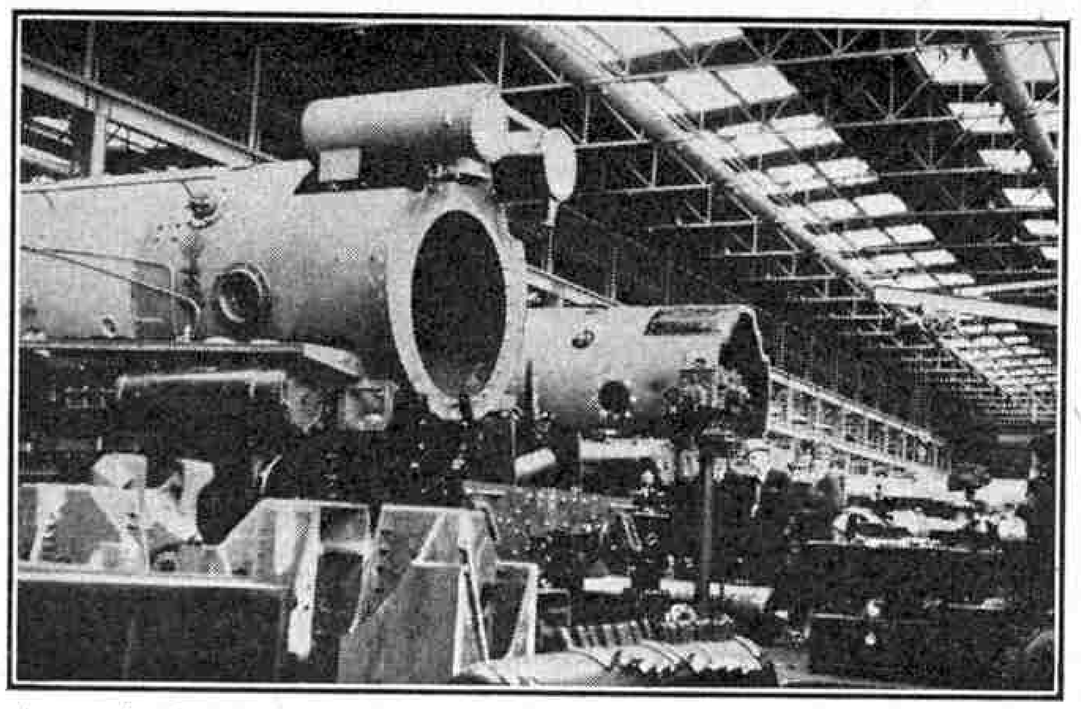
It is announced that 240 freight locomotives of the L.M.S. 2–8–0 type have been ordered for war service by the Government. The North British Locomotive Company Ltd. and Beyer, Peacock and Co. Ltd. are each to build 100, and the Vulcan Foundry Ltd. 40, of the modern Stanier design introduced in 1935. Certain modifications will be incorporated in order to fit the engines for service on the Continent. These include the provision of Westinghouse brakes for the train and steam brakes for the engines and tenders. There will be no water scoops. The connecting rods will be shortened by 5 in. and the piston rods correspondingly lengthened.

The engines have driving wheels 4 ft. 8½ in. in diameter, and two outside cylinders 18½ in. by 28 in. The boiler pressure is 225 lb. per sq. in. The engine alone weighs 72 tons, and with tender carrying 9 tons of coal and 4,000 gallons of water the total weight in working order is 127 tons.

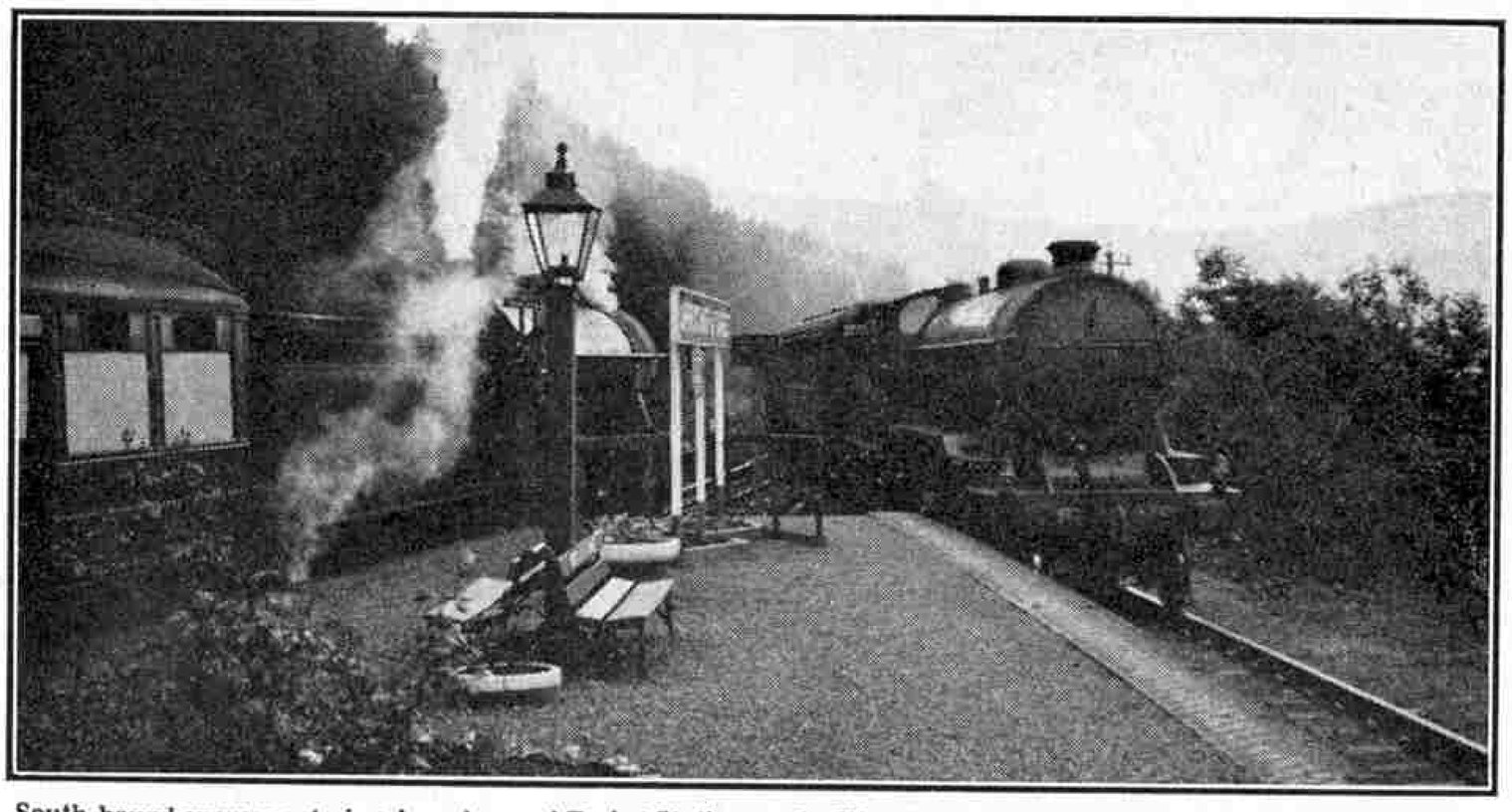
Some 10,000 wooden freight wagons of 20 tons, and having a tare weight of 12 tons capacity, also have been ordered from British firms. They will be 29 ft. 4 in. in length over buffers, with a height of just over 12 ft., and when fully equipped would be out of gauge for certain British routes, as the French loading clearance is greater than ours. These covered wagons will be the modern counterpart of the French "40 men or 8 horser" type familiar to those who served on the Continent during the last war.



The up "Coronation Scot" about to leave Glasgow Central Station. The locomotive is No. 6211 "Queen Maud," one of the original non-streamlined Pacifics. Prize-winning photograph by L. A. Strudwick, Birmingham 17.



A scene in the erecting shop of the New Zealand Railways Hutt Valley workshops, showing two of a batch of new 4-8-4's of Class Ka under construction. Prize-winning photograph by R. Schmidt, Wellington.



South-bound express entering Arrochar and Tarbet Station on the West Highland Railway. On the left is a Fort William train. Both locomotives are of the K2 Class. Prize-winning photograph by D. F. Forbes, Edinburgh.

A Wartime Freight Run

Particularly interesting both as an opportunity to inspect nearly 200 miles of the blackout, and to experience wartime freight running, was a recent journey from Camden, London, to Manchester, in the brake-van of an L.M.S. express freight train. Notwithstanding that the trip was made soon after the conclusion of a spell of very severe weather, and at a time when intensive coal train working was in operation, an absolutely clear road was enjoyed for the first 95 miles from Camden to just outside Nuneaton, where a special stop was made for water, owing to the "main" having burst at the scheduled watering-point, Tutbury. The running of the train, which consisted of 42 wagons (the first 10 being vacuum-fitted) and brake-van behind a Standard L.M.S. parallel-boiler 2–6–0 No. 2811, manned by a Longsight (Manchester) crew, was extraordinarily even, speed never quite reaching 50 m.p.h., though it was maintained at well over the 40 figure even on long rising gradients.

At Ashby Junction, Nuneaton, the train left the Western Division main line and turned across country to Burton-on-Trent via the former Ashby and Nuneaton Joint Line (L. and N.W. and Midland). There is no regular passenger service now over this section, although it is largely used by freight trains; and the journey across pitch-dark, lonely country, through eerie "ghost" stations whose platforms no longer know the tread of passengers' feet, was a strange and memorable experience. Beyond Burton-on-Trent the train entered upon the former North Staffordshire Railway, traversing the Derby–Crewe main line from Marston Junction to Uttoxeter East Junction, and there joining the N.S. Churnet Valley Line via Leek to North Rode Junction. Heavy snow still lay in the Churnet Valley, and the white-mantled hills with their rows of trees coming down to the lineside gave quite a Canadian touch to the scene.

After stopping specially at Leek for more water in the early hours of the morning, the train continued without stop through Macclesfield to Stockport, where a brief halt was made to detach, and arrived at Manchester (London Road) about 5 a.m. Within half-an-hour the train had been broken up and most of the wagons lowered by hoists into the low level shed. There they were unloaded and their contents sorted for distribution to the cartage rounds making early morning deliveries.

S.R. "Schools" Overhauls

The latest S.R. "Schools" class express engines that have returned from works overhaul to the St. Leonards and Bricklayers Arms (London) sheds are repainted in the new style, but have normal chimneys without the large Lemaitre blast pipe that had been fitted to three at least of the class. It may well be that over the steeply-graded Kent and East Sussex routes, where neither steady nor sustained high speeds rule for long, economy in coal consumption has not resulted from this departure from an undoubtedly well-proportioned design.

New Engines on the G.W.R.

New 4–6–0 engines recently turned out from Swindon include No. 5089 *"Westminster Abbey,"* of the "Castle" class, and "Halls" numbered 5986–95. The names given to the "Halls" are *"Arbury Hall," "Brocket Hall," "Bostock Hall," "Cransley Hall," "Dorford Hall," "Gresham Hall," "Harton Hall," "Kirby Hall," "Roydon Hall," "Wick Hall."* These engines form a new series named in alphabetical order.

Other new G.W.R. engines are a light 4–4–0 No. 3228, 2–6–2 tanks numbered 3104, 4130–8, 8108–9, 2–8–0s 3808–13, and 0–6–0s 2209–10, all continuing standard classes, as well as 15 0–6–0 pannier tank engines numbered 3635-49. The rebuilt Dean 0–6–0 goods engines that have gone overseas are painted a sombre black shade. They are lettered "W.D." on the tender and carry yellow painted R.O.D. numbers. Forty similar L.M.S. ex-Midland locomotives and a number from the North Eastern area of the L.N.E.R. are on loan to the G.W. in lieu.

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Tracks, terminal yards, station grounds, warehouses and other structures used in the transportation service of American railroads cover about 31,000 square miles.

Reprieved Locomotives

A significant feature of the wartime demand for locomotive power is the large scale reconditioning of engines that in the ordinary course had reached the end of their useful lives. In order to save time and meet traffic demands during the present emergency, many of these "old-stagers" are back at work of a suitable nature, although their numbers may have been announced among the "withdrawals." It is probable that freight engines, at any rate, will be turned out with plainer finish and lettering just now by way of saving materials as well as time.

A Striking Locomotive Contrast

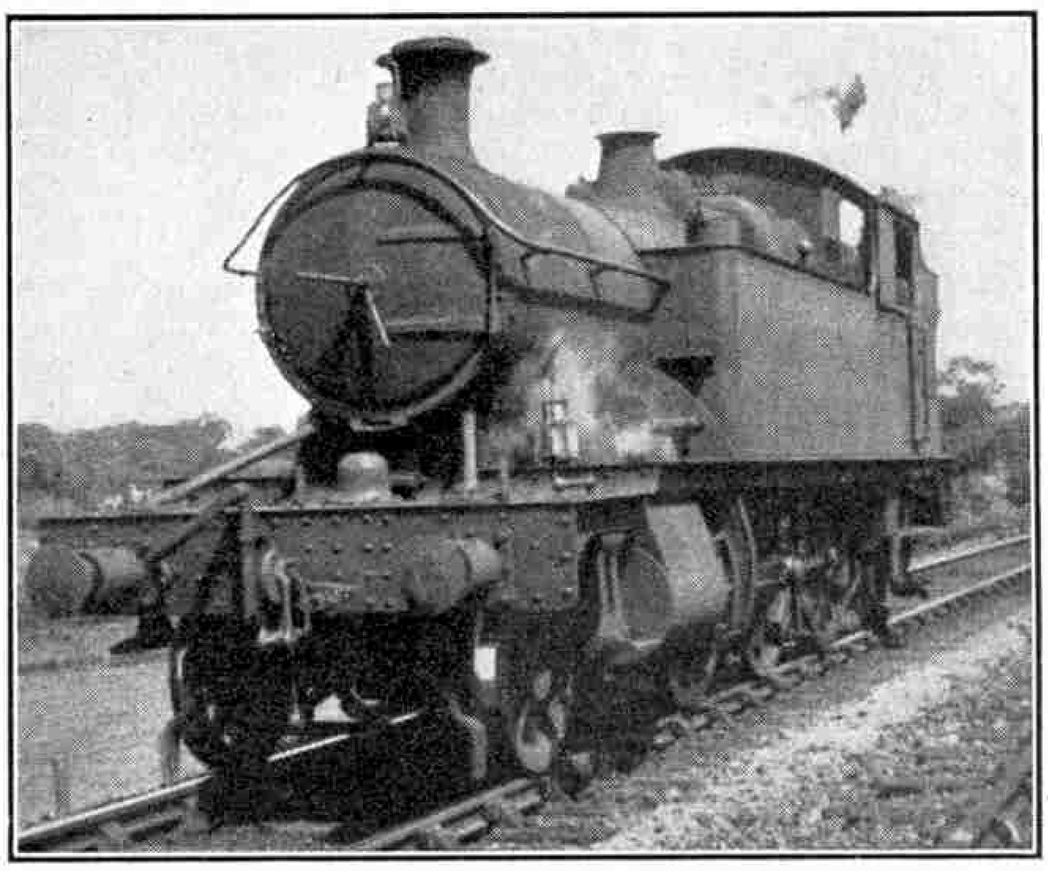
An interesting by-product of the emergency time-tables is a scheduled "dead-heat" departure from Crewe station at 5.10 p.m. of L.M.S. and G.W.R. trains, travelling initially in the same direction and on adjacent tracks. The L.M.S. representative is the 2.20 p.m. express from Blackpool to Euston, and the G.W.R. train a local passenger to Wellington.

On a recent occasion when the trains left Crewe at exactly the same moment and started off with their engines dead level, they presented a striking contrast in motive power, even though both were hauled by taper-boilered locomotives, the L.M.S. express by the Stanier 4–6–0 No. 5574 "India," with a 400-tons load, and the G.W. train of three coaches by an old "Bulldog" 4–4–0, No. 3445 *"Flamingo."*

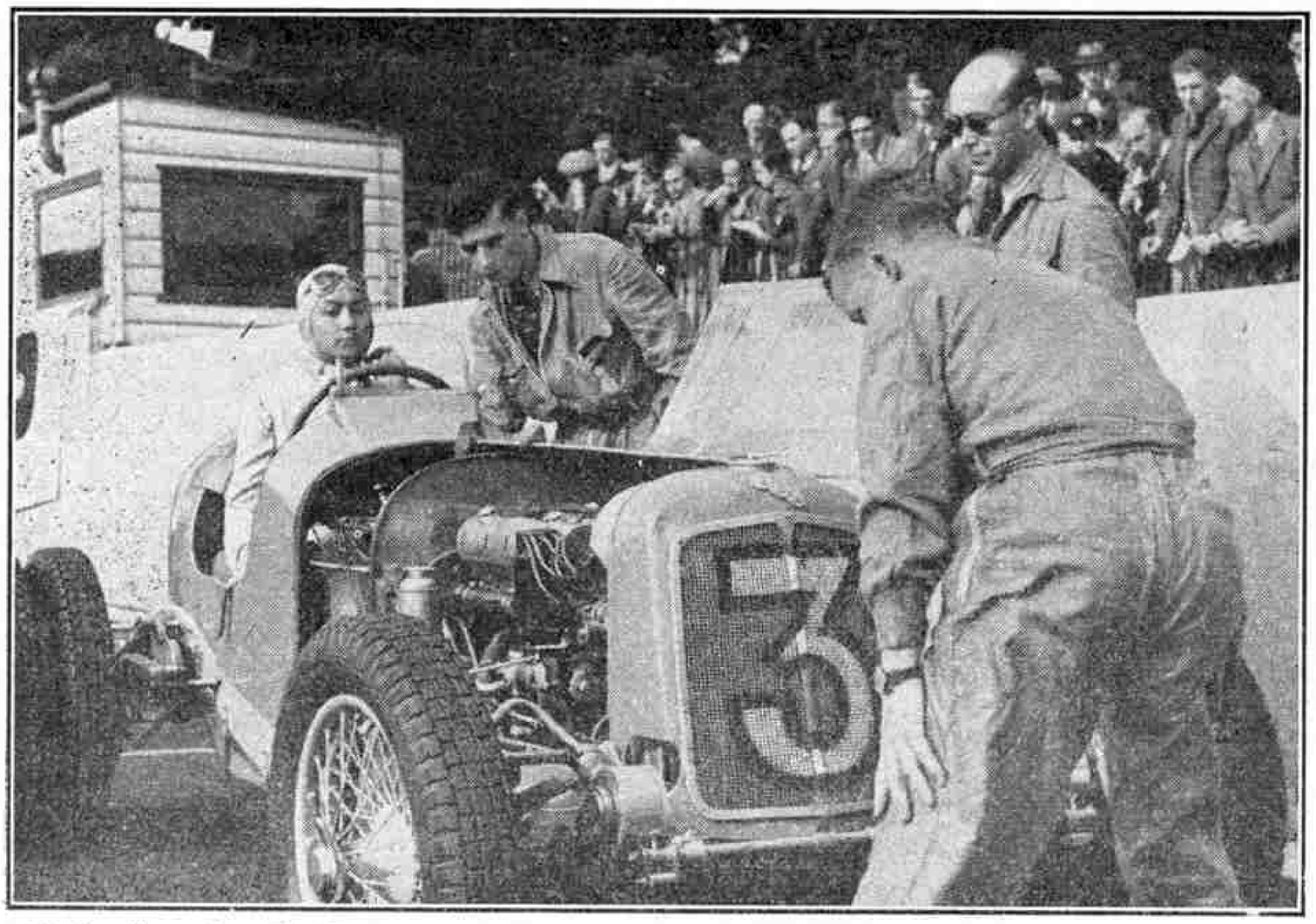
D. S. BARRIE.

L.M.S. Sentinel Steam Coach No. 29913

The Sentinel steam rail coach No. 29913, which has recently been withdrawn, was of special interest as being the only one of its type in use on the L.M.S. It was built in 1928 and taken over by the Company in the following year after trials in the Mansfield, Ambergate and Chesterfield district, and later on the Northern Division. The car was a six-cylinder 100 h.p. geared unit with cardan-shaft drive, having seating capacity for 44 passengers. It was officially allocated to the Northern Division in June 1930, and worked for a considerable time on the Elvanfoot and Wanlockhead Branch. This is the highest standard gauge line on the system.



A G.W.R. 2-6-2 Tank engine of the "4500" Class, chiefly employed for light branch line passenger traffic. Photograph by Graham Tanner, Calne, Wilts.



Starting the engine of B. Bira's car on the line at Crystal Palace to make sure that the hard plugs are in order.

A Motor Racing Mechanic Speaks

By Alexander Rahm

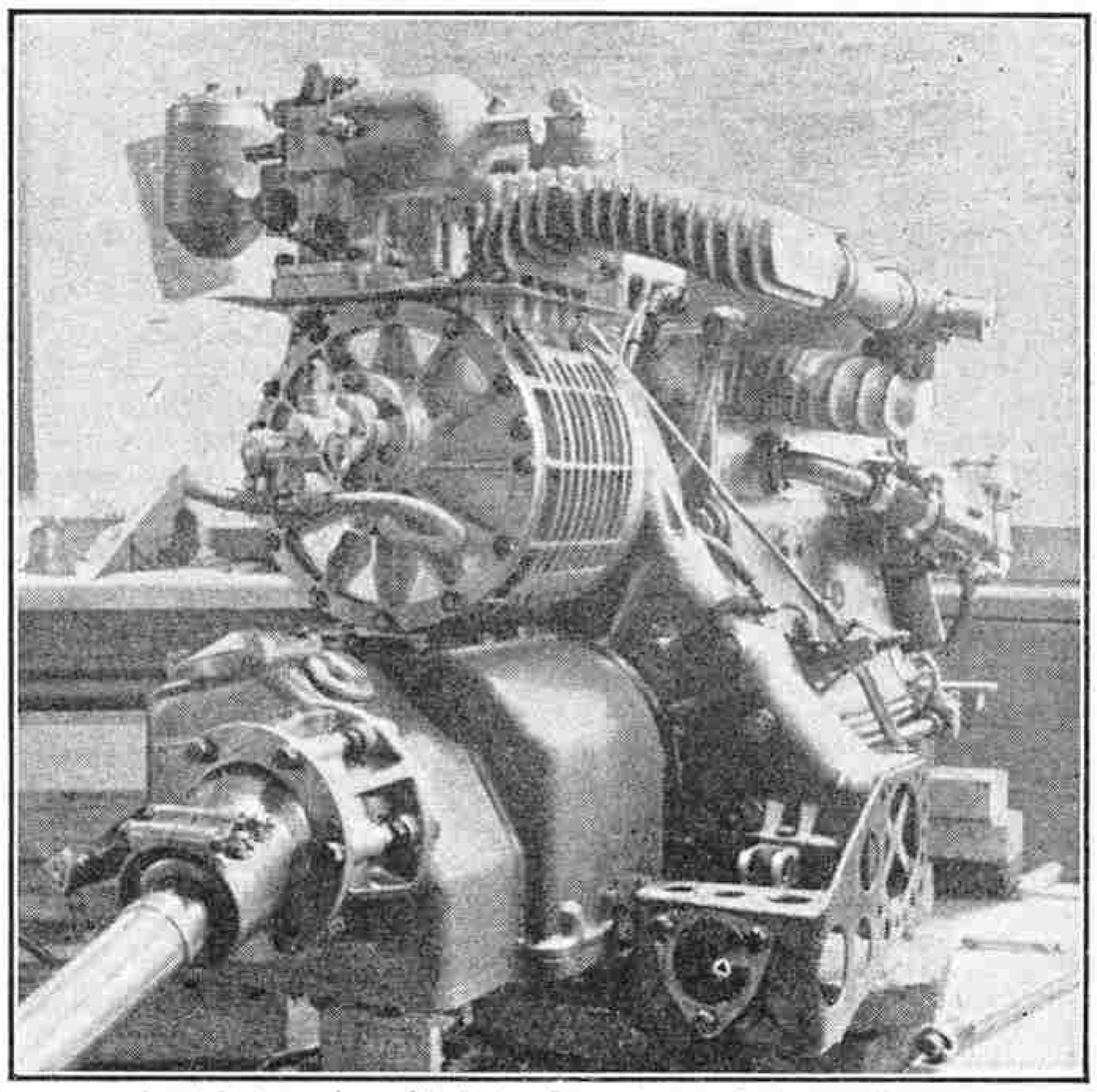
THOSE of you who have been regular readers of the "*Meccano Magazine*" for some years may remember an article in the March number of 1933 describing an astronomical clock built up of Meccano parts. The Editor was kind enough to refer to it then as "The World's Greatest Meccano Model." That many better models have been made since I have no doubt, hence I can overcome my bashfulness and state that I was the creator of that clock, and that it was the result of more than four years of planning and construction.

During the last four years I have been engaged in an entirely different kind of work, no less interesting, and in some ways far more exciting. I have been a motor racing mechanic since 1936. I was fortunate enough to be attached to an exceptionally successful organisation, The White Mouse Garage, owned and managed by Prince Chula of Thailand (formerly Siam). The actual driver was "B. Bira," undoubtedly one of the most brilliant and colourful members of the motor-racing world during the last 10 years. In five seasons he amassed the astounding total of 20 major victories as well as innumerable second and third places. He also created a unique record, which is likely to remain for some time, of winning for three successive years, 1936–1937–1938, the British Racing Driver's Club Gold Star, the symbol of British road racing championship.

The public see and hear of in motor racing only the tremendous feats of the drivers, who thereby get almost all the credit and publicity. Faced as they are with overwhelming difficulties and danger, no one would think of begrudging them all the praise and hero-worship that come their way. Bira certainly had some difficult situations to tackle in his meritorious career. A nasty moment occurred at Limerick (Eire) in 1936. The Duke of Grafton, driving a big Bugatti, had a bad skid only a few seconds after the start. The tail of the car scraped a wall, causing the petrol tank to split and leak. The friction and the spilt petrol resulted in a fire. As Bira arrived a second or two later he saw ahead of him a wall of flame. A moment's hesitation and Bira's car too might have got into a skid. He decided in a flash, and tore his way through the flame to safety. How close had been his peril was revealed later by the death of the unfortunate Duke, suffering from severe burns.

Then there was that accident during practice for the French Grand Prix at Rheims last July. Bira had been making the fastest times lap after lap during an early morning practice. Then as we waited for him to come past the replenishment pits again, we soon realised that he was overdue. Our anxiety was confirmed when the voice on the loud-speaker asked for an ambulance. Bira had misjudged his speed and position at a curve that he had taken safely during the previous five laps. This time the car got into a wild skid at 110 m.p.h. It turned over as it struck an earth bank and rolled over and over again, ending as an almost total wreck. Luckily Bira was thrown out at the first impact and only had one wound in the leg.

The driver deserves all the credit he gets; yet I think I may say that we mechanics also have a valuable part to play. As this is not so well known, a few words on the subject may be of interest. In the first place no racing car has any chance whatever of covering the full distance of a



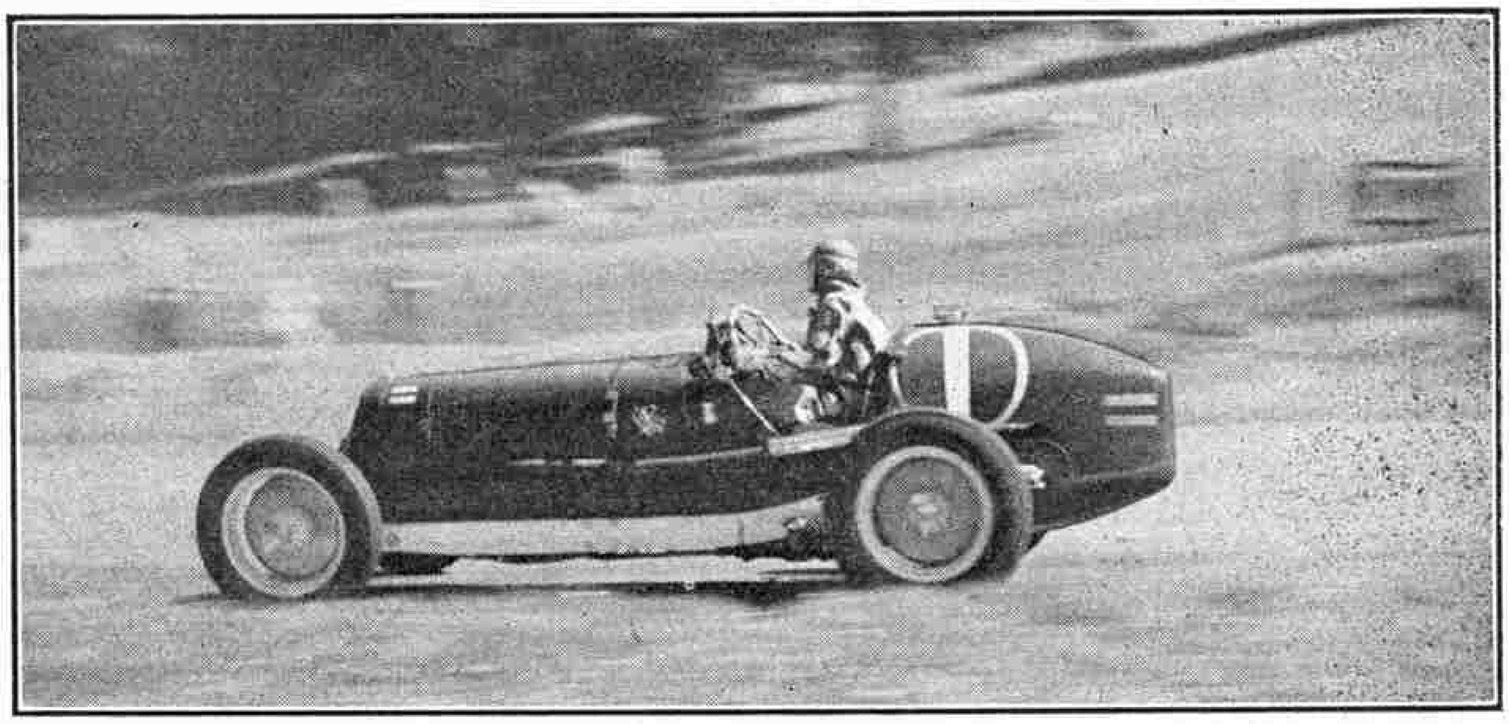
An E.R.A. engine with Zoller Supercharger, just assembled.

race, let alone winning it, unless it has had the most careful preparation.

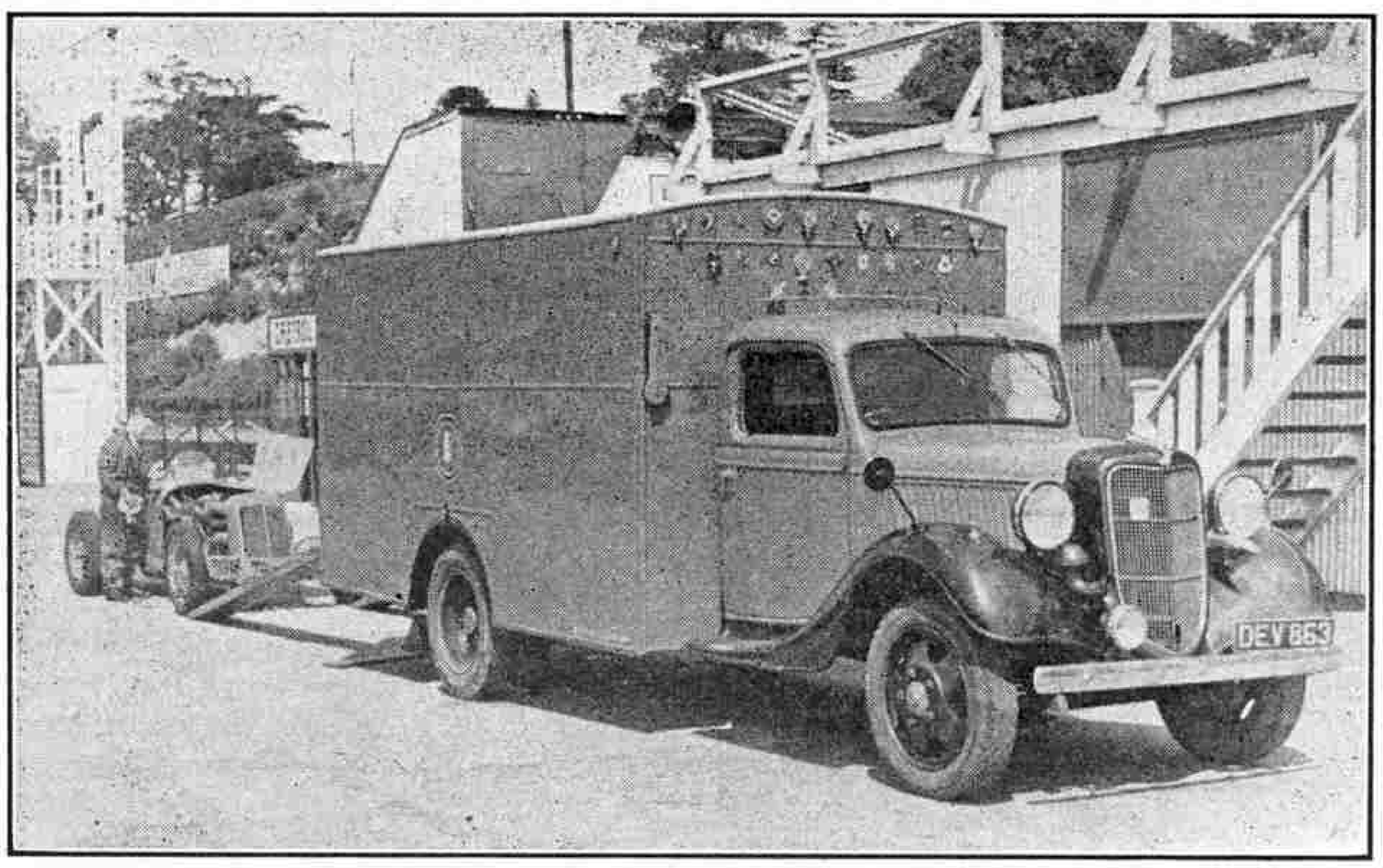
A truly first-class preparation undertaken by two mechanics may take as much as three weeks. The engine must be completely taken down into little pieces. Each piece must be scrutinised for flaws or wear in the steel. The faulty parts have to be replaced. The re-assembling of the engine must be done with minute care with everything properly balanced. Then there are brakes and brake drums to be examined and adjusted. The radiator also has to be looked at to prevent any water from leaking in the race. We then have to look at the chassis carefully, for racing chassis are light and may crack without warning. The petrol tank too must be in the best condition before it can be put on the chassis. These are only the major things that we have to do, and yet there is still a mass of details.

When our work is done, which is often late at night, we usually have to get up early the next morning to attend the practice. Then the driver often comes in and reports that several things are wrong with the car, and we have to work sometimes all night to get the car ready for the next day.

Donington at eight consecutive week-ends. At the close of the British Empire Trophy Race in April 1936 we left with the van at 8 p.m. On arrival in London at 2 a.m. we reloaded the van with another racing car and left London at 4 a.m. for Dover, where some three hours later we had breakfast. We crossed over to France and were in Paris by 7 p.m. Our labours were more than fully rewarded, for Bira won a brilliant victory in the Monaco "Round-the-houses" Race a few days later.



Bira concentrating as he brakes for Old Hairpin.



The big Ford Van, with an E.R.A. racing car just unladen at Brooklands in the Paddock.

Then there was the enormous amount of travelling we had to do with the huge Ford van carrying the racing car. I have been to races in Ireland, France, Germany, Italy, Switzerland, and Czecho-Slovakia. At one period of the 1937 season, we raced at the Crystal Palace, Bern (Switzerland), Brooklands, Donington, Dublin, Brooklands, Brno (Czecho-Slovakia), and again

Another part of our important work is done during the pit stop in the middle of the race. In a long race of 200 miles or more, a car will usually have to stop for replenishment of petrol and oil, and sometimes wheels also have to be changed. As races are often won by the margin of under a minute, it is exceedingly important that pit stops should be as quick as is humanly possible. My colleagues and I have filled up with 16 gallons of petrol, as well as two gallons of oil, in only 35 seconds from the moment the car stopped to its re-start.

Then there are pit stops for trouble with the car. Sometimes two or more plugs would get oiled up. The driver would soon realise that the engine had lost its clear crisp note and the car lost its full power. He would then pull into the pits, and we would have to change the plugs with lightning speed and get him off again. In the International Trophy Race of this year, when Bira was leading comfortably, he suddenly came to the pits because the car seemed to be overheating owing to lack of water. Like a flash a mechanic had jumped over the pit counter, the radiator was refilled, the car was then pushed off in a few seconds, and once again Bira was to score another brilliant victory.

Hard work and excitement is the mechanics' lot, yet there is danger also. At the last Tourist Trophy Race to be run over the famous Ards Circuit outside Belfast in Northern Ireland, my duty was to fill up with petrol. As Bira came into the pits I whipped open the filler-cap and fixed a funnel to the tank. Churn after churn I poured in. When I finished I lifted the funnel. An air-lock had formed in the petrol tank, and as I took out the funnel, petrol gushed back into my face and eyes. The pain was excruciating and I was completely blinded for several hours. There have also been many cases of mechanics suffering from burns and other injuries. An ideal race for a mechanic is the dullest for the spectators. It is the race when his car holds an easy lead from the beginning to the end without any trouble whatsoever.



From Our Readers

These pages are reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

A Tour of Western Cornwall

The Scout Troop to which I belong held their camp last summer near Veryan, Cornwall. One event that we particularly enjoyed was an all-day tour of the western half of the Duchy. We set out about 9.30 a.m. from our camp site. Our first stop was Truro, 14 miles away, but we did not stay there long, and were soon heading westward. In the distance could be seen the town of St. Austell with its china-clay pits.

After passing through miles of Cornish country-side we caught a glimpse of Falmouth and then arrived at the fishing village of Porthleven. From Porthleven we again went westward, and arrived at Penzance soon after midday after passing through Marazion, where we saw St. Michael's Mount a few hundred yards from the town.

Land's End was the next halt. We remained there for a couple of hours, visiting the First and Last House in England. Land's End is very rocky and is 60 ft. high. From it we saw the Longships Lighthouse, with the surf breaking over the rocks on which it is built.

From Land's End we went to St. Ives and on the way we noticed other buildings, including a church, that claimed to be the first and last of their kind in England. At St. Ives we went for a sail. After leaving the harbour the Atlantic swell could be felt, but we were all good sailors and there were no catastrophes!

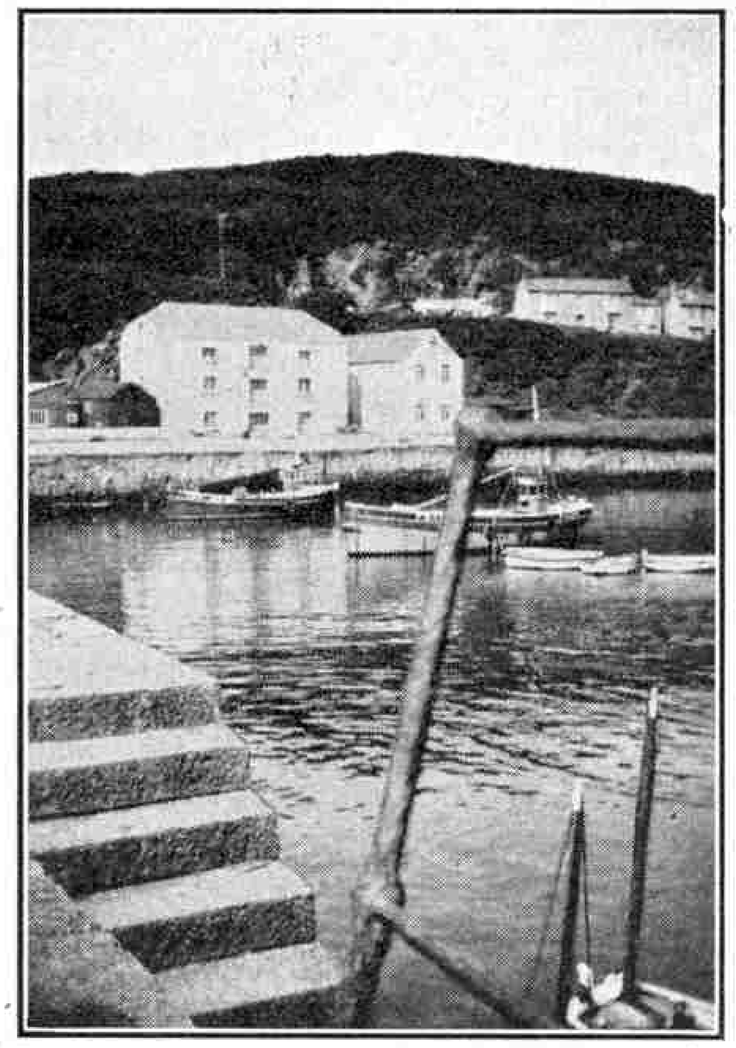
On the homeward journey we passed through Redruth and Truro, and as we rushed through the countryside, the motor-coach at times seemed to fill the whole of the narrow road. We reached Veryan tired but happy after a very full day.

C. C. GOLDSMITH (Romford).

The Haversham Bridge Reconstruction

In October of last year the road bridge at Haversham was washed away during floods. The bridge had been built over 100 years ago. It was a skew arch structure with two spans, each of 33 ft. 8 in. In 1938 its width was increased by 9 ft. on the downstream side but, except for a new parapet made necessary when the road was elevated, the old bridge was untouched, although it was eroded on its upstream face.

A footbridge was erected when the floods subsided, and this was ready by 30th Oct. In the meantime the constructors who were to build the new bridge had established themselves. On the north bank they erected a large steam derrick, and other plant and materials assembled included an auxiliary boiler and a concrete mixer, with a considerable quantity of timber, coal, sand, cement and steel piles which were dumped at the roadside. On the other bank were erected portable office buildings, and sections of a bridge of 61 ft. span were brought from a road diversion in a neighbouring county and stacked on the roadside.



The harbour at Porthleven, Cornwall. Photograph by C. C. Goldsmith, Romford.

While footings were being prepared at each end of the old bridge, a steam pile-driver was busy sinking steel piles to form a cofferdam for a new pier near the Haversham or north end, since the bridge was not quite long enough to span the gap. Despite the fallen masonry, concrete slabs from the road and severe floods, the new pier of reinforced concrete rose rapidly to road level.

The new bridge was brought to the spot in eight sections. Each section was half a truss, and two trusses were bolted closely side by side to form a single girder. The girders were spaced several feet apart across the river, and transverse steel beams were laid across, projecting on the east side. All the steel work was painted during erection. By 18th November work had begun on the deck, which was of timber and asphalt. The short span was made up of steel "I" beams similar to those placed across the main span.

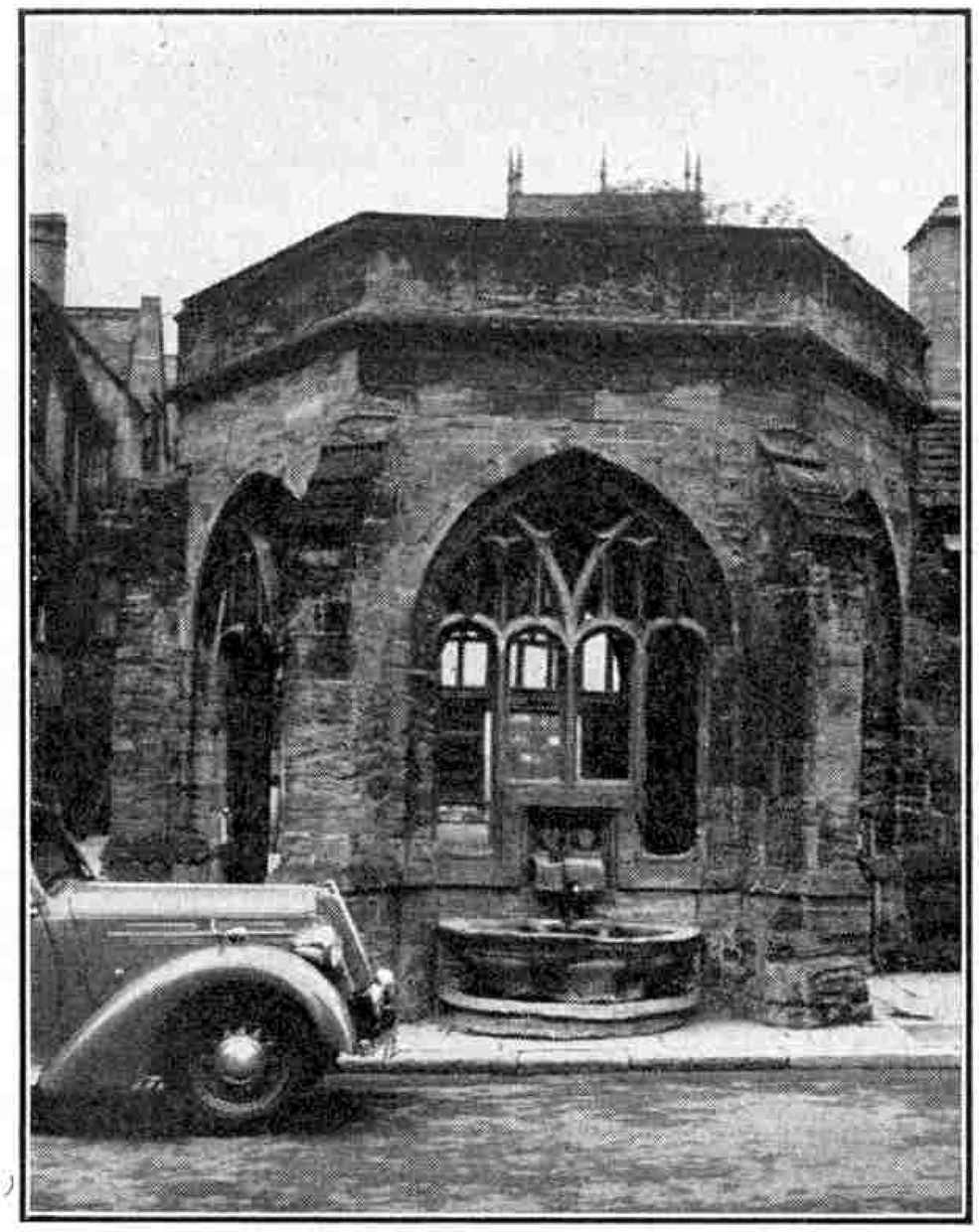
The new bridge was open to traffic on 28th November. It has a 12-ft. carriageway inside the girders, and a 4-ft. footpath on the outside of the east girder. The work was still unfinished. Next the first footbridge had to be removed, and its timber baulks were used as a curb to the carriageway. The derrick crane, which had proved invaluable in pile-driving and erection, was then removed. E. INSTONE (Bletchley).

The Sherborne Conduit

The principal buildings of the Benedictine Monastery of Sherborne, in Dorset, were grouped round the Cloister Court, and in the middle of this stood the Sherborne Conduit. This was built by Abbot Mere over 400 years ago, and the monks did their washing and shaving there.

The Conduit was moved to its present position on the Parade about 1570. Thus it is now in the centre of the town, a position where it arouses much comment from visitors. The water comes from the New-Well spring, which also supplies the swimming bath at Sherborne School.

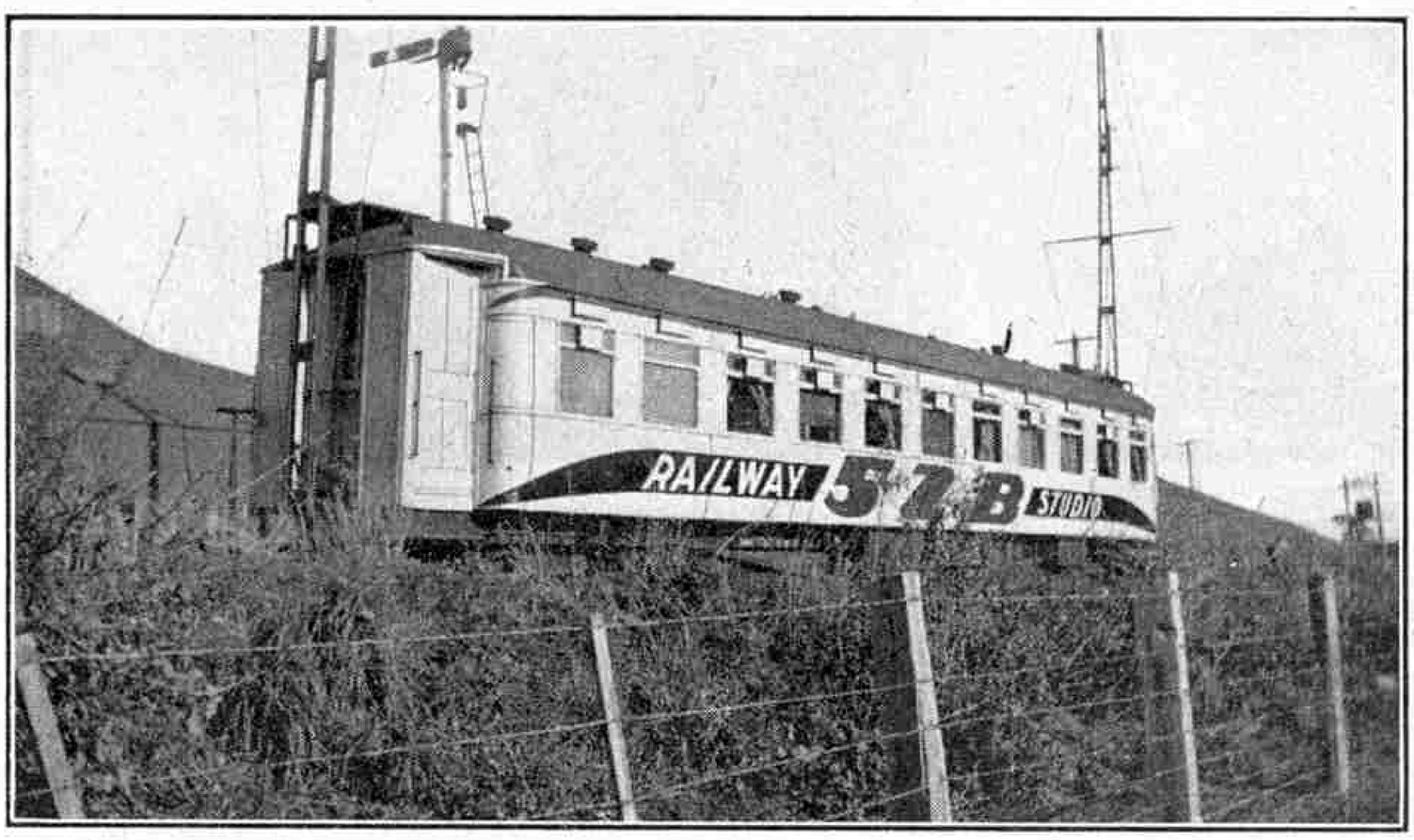
In 1834 the windows were glazed and a door was put in, and the structure was furnished as a town reading room. Later it was used rent free as a police station, after which it was converted into a Penny Bank at a yearly rent of £1. After a year or two the rent ceased to be paid, which leads one to think the inhabitants with superfluous pennies had little faith in the burglar-proof qualities of this venerable relic of the middle age.



Sherborne Conduit. Photograph by J. Gillard, Sherborne.

Now the Conduit belongs to the town of Sherborne. An odd dray horse may be seen being watered at the font; otherwise it is simply a building with a past, although a very interesting one.

JAMES GILLARD (Sherborne).



A railway coach in which a radio station is installed. Photograph by R. J. Curnie, Masterton, New Zealand.

Radio on Rails in New Zealand

The National Commercial Broadcasting Service of New Zealand has the only completely equipped radio station that can roll away at express speed when its programme is finished.

The station literally travels at express speed, for its home is a railway coach. It was built in answer to insistent demands from certain provincial towns for wireless stations of their own. It was claimed that these centres, each of 16,000 to 25,000 inhabitants, must have intense local coverage. The N.C.B. therefore took over car 1710 from the New Zealand Railways and converted it into a model station with studio and staff compartments. This was sent out on tour, staying a fortnight at each important small city.

During a tour of eight months the car transmitted from 16 towns and it excited great interest everywhere it halted. It also has been rushed to places from which special news broadcasts were required. For instance, it covered the opening of the East Coast Railway at Wairoa, an event of great importance.

Now 15,000 people have inspected the radio coach daily at the New Zealand Centennial Exhibition.

R. J. CURRIE
(Masterton, New Zealand).

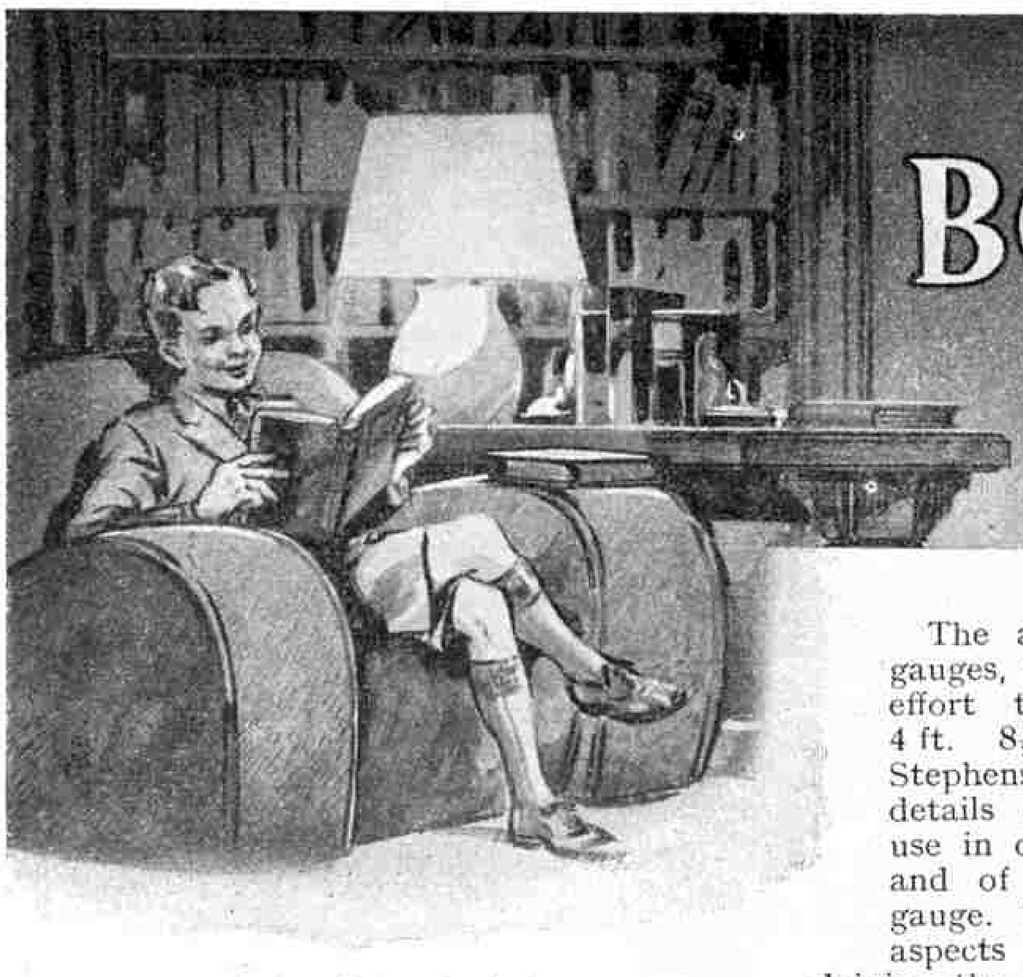
Down Below in a Trawler

While camping at Rossall, near Fleetwood, I and my friends went to Wyre Dock, where we were shown over the trawler *"The Northern Reward."* After sliding rather ignominously about on two or three stray fishes, we managed to get on board the vessel, which at the time was being coaled. In the men's quarters, which were shown to us first, the bunks seemed very narrow, but we were assured that they were quite comfortable.

On going down a narrow gangway, we reached the ship's dynamos, and below us, through a grating floor, we could see the engines. These were next examined and then with assistance I managed to push open a heavy iron door, with a strong spring, so that we could enter the stokehold. There we saw the front ends of two boilers, each with its appropriate array of instruments, and a huge heap of coal. We were down in the heart of the ship, and realised what little chance the stokers would stand if their vessel were to sink.

We returned to the deck up a vertical steel ladder, and then visited the bridge and wheelhouse. The most interesting thing to be recalled about the latter was a small wood box housed in one corner. This was rectangular, and on its black glass face were white lines drawn horizontally, each with a number at each end. Across the zero line moved a small speck of light. This, our guide told us, was a device for registering the number of feet of water drawn by the vehicle.

JAMES HARRISON (Hoghton, Nr. Preston).



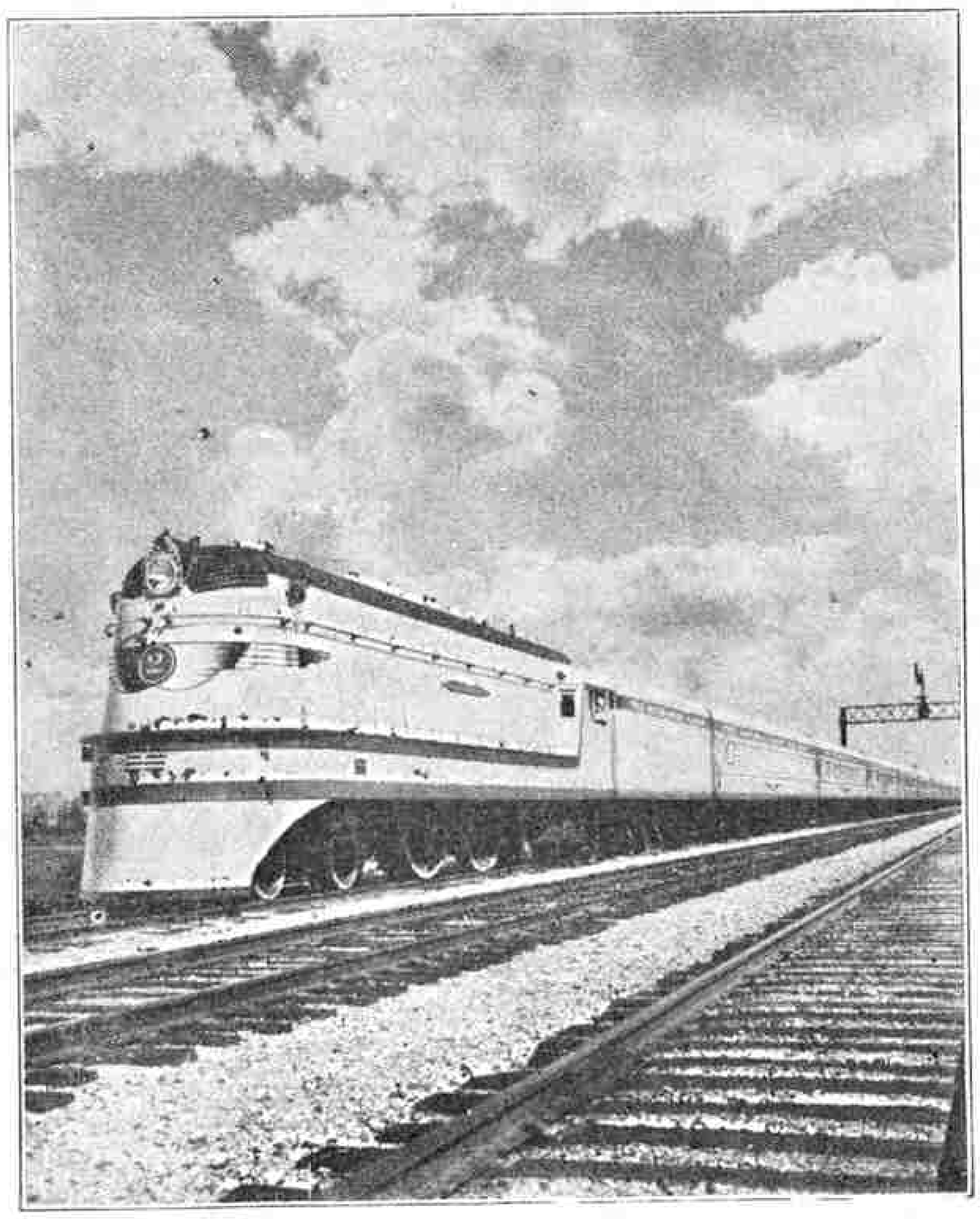
BOOKS to READ

Here we review books of interest and of use to readers of the "M.M." With the exception of those issued by the Scientific and Children's Book Clubs, which are available only to members, we can supply copies of these books to readers who cannot obtain them through the usual channels. Order from Book Dept., Meccano Limited, Binns Road, Liverpool 13, adding 1/- for postage to the price. Postage on different books varies, but any balance remaining will be refunded.

"The Romantic Story of the Iron Road"

By CECIL J. ALLEN, M.Inst.T.
(Hutchinson. 6/- net)

The name of Mr. Cecil J. Allen on the title page of a book on railways is a guarantee at once of complete accuracy and intense interest. His latest volume can be strongly recommended to all readers of the "*M.M.*" It gives a very comprehensive survey of the subject, and is exceptionally well illustrated, containing 193 attractive half-tone illustrations, many of them of full page size.



The "Hiawatha" of the Chicago, Milwaukee, St. Pauls Pacific Railroad.

The author begins with railway gauges, telling the story of Brunel's effort to break away from the 4 ft. 8½ in. adopted by George Stephenson and giving interesting details of the various gauges in use in different parts of the World and of "toy" railways of narrow gauge. Then he takes up various aspects of railway engineering, explaining the wonders of the construction of railways through the Alps, the Rockies and other mountain ranges, and of rack railways that actually climb mountains. The boring of great tunnels and the construction of the world's most famous bridges and viaducts are described, and then we read how the permanent way is laid down, and how it is continually being improved in order to give smoother, safer and speedier running.

One of the most important branches of railway working is signalling. Mr. Allen's story of the continuous efforts to improve the methods used helps us to realise the truth of the boast that "the safest place in all the world is the inside of a railway train." Semaphore and colour-light signals and modern route indicators are well described, and in an attractive chapter we watch the signalman actually at work in his cabin.

The rest of Mr. Allen's book is devoted to locomotives and rolling stock. An admirable chapter traces the development of the locomotive from the pioneer engines of Richard Trevithick, who designed and built the first steam locomotive that ever ran on rails, to those of Blenkinsop, Hedley and of George Stephenson, the most famous of all railway pioneers. Then we turn to locomotives of modern times, learning why various wheel arrangements have been developed and different types of engines introduced for particular duties. How a locomotive is built and how it works are explained in simple language, after which we see it at home in its shed and accompany it on the road.

The final chapters give fascinating details of locomotive trial runs and speed records, with stories of world-famous flyers. The book ends with a section on electric railways, in which the advantages of electrification, such as rapid acceleration, are well explained, and details are given of various schemes now in progress.

"John Brunton's Book"

(University Press, Cambridge. 7/6 net)

This is a remarkable book which, as Professor C. H. Clapham points out in his introduction to it, gives us a first-hand life history of one of the versatile and matter-of-fact English engineers who lived in the 19th century. Mr. Brunton's life spanned the period from the days of Thomas Telford to the end of the century. As a young engineer he worked with George and Robert Stephenson and with Brunel. Then he built and equipped hospitals in Crimea during the War, and there met Florence Nightingale. He next went to India during the Mutiny, building railways, shooting crocodiles, dealing with Rajahs and bridging rivers. Wherever his work called him he showed himself to be a resourceful engineer, fearless, efficient and prompt, and ready to cut official red tape and oppose authority when it seemed to him ridiculous. His diary is a plain picture of a crowded life.

It is impossible in a short review to mention all the good things in the book. An early story tells of a journey by chaise from Wakefield to Manchester with George Stephenson, who stopped at a toll-house to show a shoemaker how to make cobbler's wax, and thereby missed his train to Liverpool. Brunton gained from this a lecture from George on the advantage of being self-reliant. Another good story describes how the author gave an Indian prince his first trip in a steamer. This event was watched by an immense crowd of Indians, who became suspicious that their Nawab was being spirited away from them. The Nawab began to think so too. He flourished a dagger and his attendants drew their swords, but Brunton calmly proceeded with the trip, undeterred by the violence raging around him. One of his last efforts in India was to outshoot a Colonel of regulars in a match, although he himself was only a volunteer. Even when he returned to England his energy was unabated. He practised as a consulting engineer for more than 20 years, retiring only when he reached the age of 77.

Older readers of the "*M.M.*" particularly will profit from this remarkable diary, written by a man who was vigorous, active and wise.

"Model Boat Building"

By F. J. CAMM. (Newnes. 3/6 net)

Here is an excellent practical book on the construction of model boats of all kinds, including both sailing boats and those driven by power. It covers the whole ground of constructional methods, including the arrangements of keels and hulls, sail planning, spars and rigging and steering systems. Details are given for the construction of a variety of model boats, and of a novel steering device.

The book contains 151 half-tone and line illustrations to guide the constructor.

"Modern Armaments"

By Professor A. M. Low
(The Scientific Book Club. 2/6)

The production of armaments is to-day the world's biggest industry, and it is only natural that there should be an intense interest in armaments of all kinds. This interest Professor Low has set himself out to satisfy. He is well qualified to do so, for he was responsible for many applications of science to warfare during the Great War of 1914–18. He has provided a very complete survey of modern weapons, written for non-technical readers in language that is easy to understand, and he leaves no doubt in the mind of the reader of the effectiveness of modern scientific warfare.

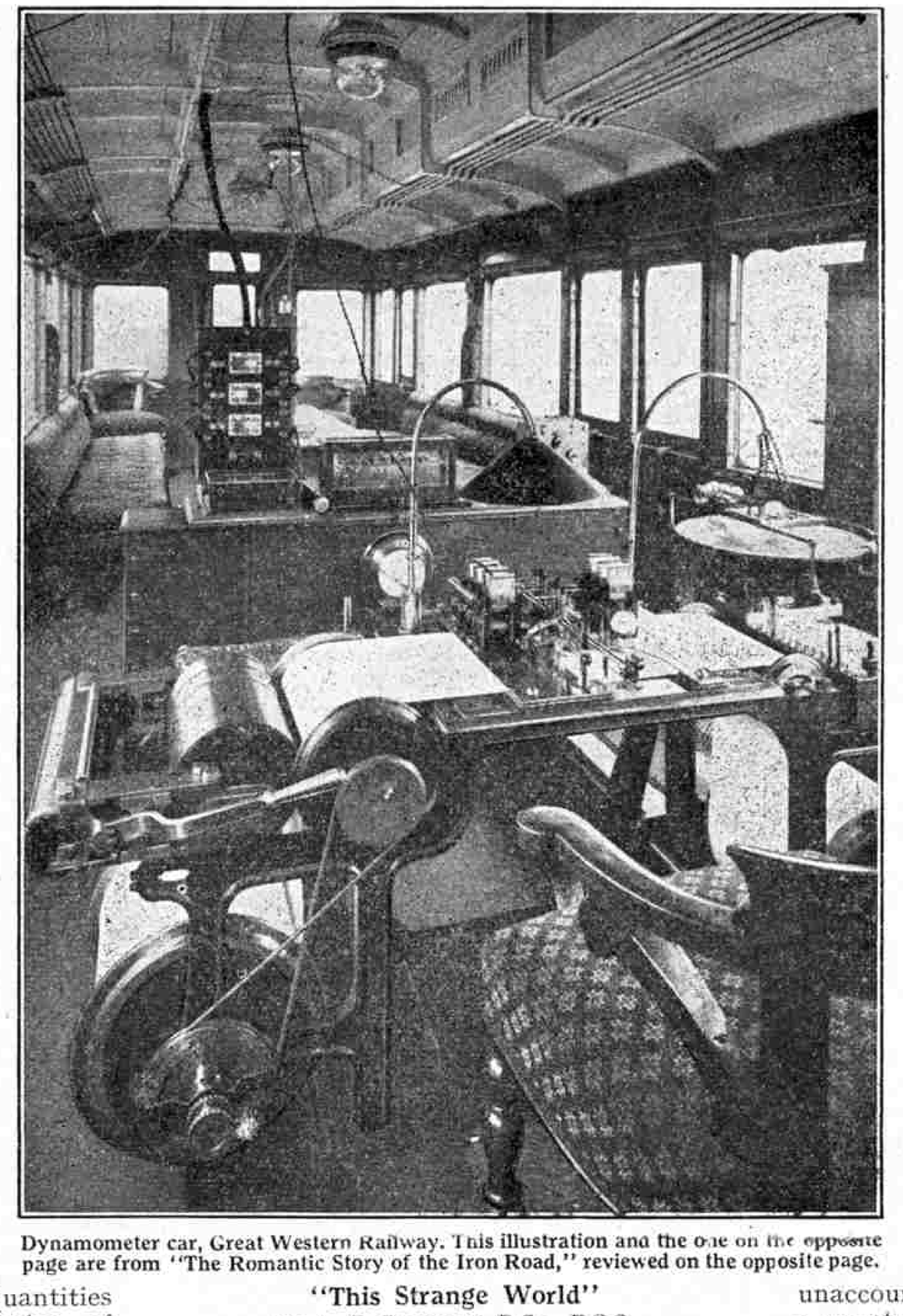
Professor Low takes up the interesting question whether science makes war more horrible. He does not think that such a charge can be supported, and as far as the future is concerned he has no faith in any of the dreadful secret weapons of which we hear rumours from time to time. He points out that if we are not discouraged from going to war by flame throwers, gas, high explosive or even germ warfare, it is scarcely likely that there remains anything sufficiently dreadful to frighten us into being peaceful!

In turn the author deals with explosives and guns of all sizes, pointing out with emphasis the immense advances that have been made in the effectiveness of firearms within very recent times. A special chapter deals with concrete, the great defensive weapon used in immense quantities in constructing the largest chains of fortification that the world has ever known. Then we come to the application to warfare of light, sound and chemistry. Here every page gives interesting details that will help readers to understand what was done during the last war and what may be looked for in the present war. The author thinks that the possibility of success by means of new and more deadly gases is very remote, for chemists have been as successful in evolving means of defence against weapons of this kind as they have been in producing them.

Warships, mines and torpedoes, and tanks are dealt with in the next chapters, which are full of exact detail; and then comes the story of the aeroplane and war in the air. The book ends with a consideration of wireless as a weapon of war, which can be used to corrupt people's minds, a very important feature of modern warfare, and with a discussion of terrors of future warfare as the author sees it. His forecast is somewhat comforting. Death rays, microbe warfare and other products of fiction are shown to be illusory, and even if they were practicable most of them would be as dangerous to their users as to the enemy.

As a postscript to his story of death and destruction the author shows that the results of war are not all evil, for it speeds up invention and new means of tackling the problems of peace result from war-like activities. Even the use of poison gases in the Great War has since been turned to advantage in various directions, as Professor Low demonstrates.

There are 32 excellent full-page plates.



Dynamometer car, Great Western Railway. This illustration and the one on the opposite page are from "The Romantic Story of the Iron Road," reviewed on the opposite page.

"This Strange World"

By A. E. Trueman, D.Sc., F.G.S.
(The Scientific Book Club. 2/6)

The Earth is our home and it is therefore only natural that we should wish to know as much as we can about both its surface and its interior. Mr. Trueman has written a book to meet these needs. This was specially prepared for members of the Scientific Book Club, and is not a text book, but a very interesting story suitable for readers without any previous knowledge of the subject. At the same time it is one that will be read with interest and profit by those who already know something of geology.

The author starts with an exploration of the Earth's crust, explaining how the rocks of which it is composed were formed. The subsequent history of the rocks, many of which have been twisted and folded in the most fantastic manner, is given briefly, and then we turn to the story of Great Britain as the geologist sees it, a fascinating account of changes in scene and climate extending over millions of years. Next is a series of interesting problems and their solutions. How old is the Earth? What is its interior like? How were the great mountain ranges raised upward? These and other questions in which we are all interested are answered simply but adequately. The Ice Ages, when huge glaciers spread over the greater part of Britain, slow but inexorable changes in sea level, and the mystery of drifting continents also are dealt with, and finally we see how the geologist has helped in the search for coal, metallic ores, oil, water and other treasures of the Earth.

The book is well illustrated.

"The Great Tabu"

By L. Patrick Greene
(Harrap. 5/- net)

Tabu Dick is a white boy whose life was saved from murderous natives by his nurse, a native woman who declared him under the protection of the Spirits. Thus he became "He-who-must-not-be-touched." He grew up in the African forest, rich in native lore but with the added advantage of a white man's training. His understanding of natives is complete, and he has many exciting adventures while quelling rebellions, outwitting witch doctors, and hunting leopards, crocodiles and poisonous snakes.

The author knows the country and the people dealt with in the book thoroughly, for he had many years' service in the British South African Police. With his deep knowledge and sense of adventure and character he has written a fascinating book.

There is a coloured frontispiece and four full page illustrations.

"Mystery Manor"

By M. E. Atkinson
(Children's Book Club. 2/6)

Miss Atkinson has written a delightful story that will thrill our younger readers. In it six children, all interesting characters, set out to prove that there are no such things as ghosts, although Wilbrow Manor, near which they are enjoying a holiday, is said to be haunted. They explore the Manor thoroughly, setting traps for unauthorised visitors, and after weird experiences with footprints, strange noises, and ladders that disappear unaccountably, they find down a well a secret passage that leads to a mysterious room in the basement. But one of the ghosts turns out to be the village grocer, a harmless little man, and the other is a descendant of its former owners and has no evil intentions. So everything ends well, and readers will enjoy the clever detective work of the ghost hunters, and the fun they have during the hunt. There are many illustrations in line.

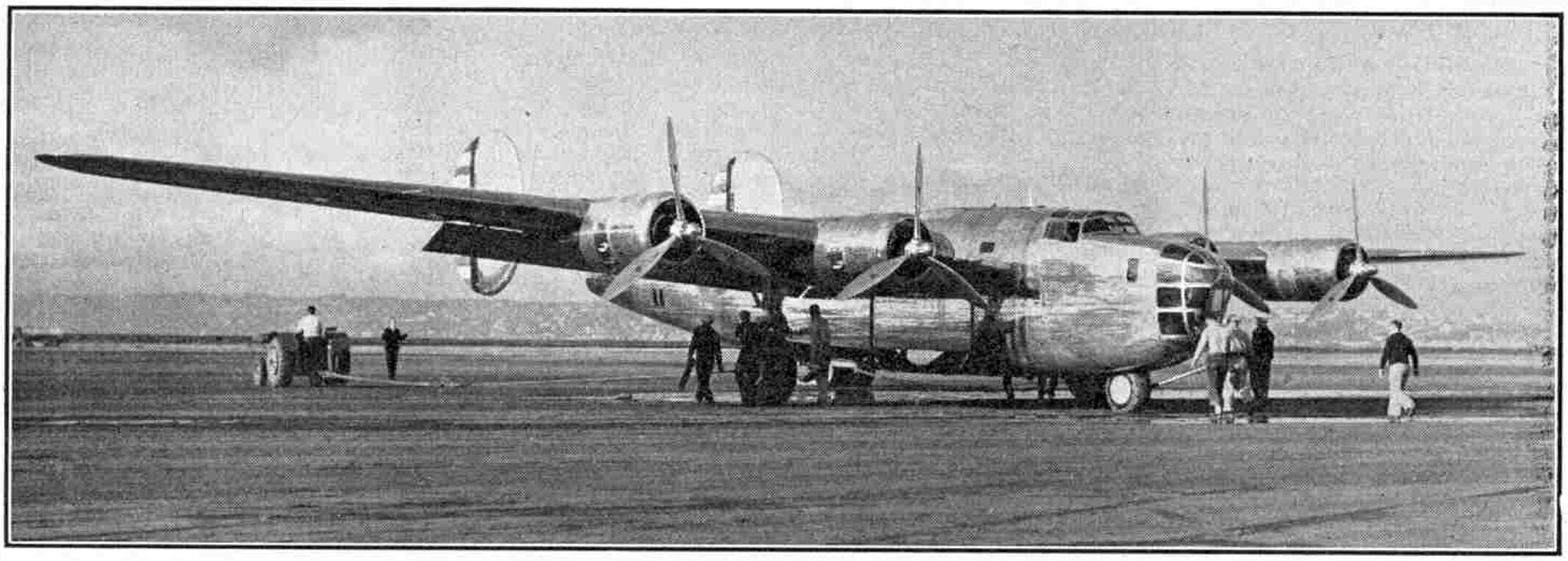
"Modern Ignition Simply Explained"

By H. H. U. Cross
(Technical Press Institute. 5/- net)

Mr. Cross's book is one of the excellent Technical Press Manuals, and is a simply written account of modern ignition systems used for motor vehicles, motor boats and aircraft. It does not delve into every little constructional detail, but the reader is given a thorough understanding of the principles on which electrical ignition systems are based.

The book begins with a general explanation giving in brief the electrical information that is necessary. A chapter is devoted to electrical induction, which plays a special part in ignition devices, and then the various types of magneto and coil systems are fully described. How ignition is timed and the construction of plugs also are dealt with, and a practical section on care and maintenance completes a very useful and comprehensive survey.

Free use is made in the book of line and other illustrations, of which there are 62 in addition to a folded plate for use in tracing faults.



The new XB-24 heavy bomber for the United States Army Air Corps being towed on to Lindbergh Field aerodrome, San Diego. It was built by the Consolidated Aircraft Corporation, U.S.A., to whom we are indebted for this photograph.

Air News

Latest American Heavy Bomber

The latest type of heavy bomber for the United States Army Air Corps is shown in the fine photograph at the top of this page. This machine has been built by the Consolidated Aircraft Corporation, of California, U.S.A., and recently made its first flight at Lindbergh Field, San Diego.

It is technically known as the XB-24, and is a high wing all-metal monoplane with a span of 110 ft. and a length of 64 ft. The stressed skin fuselage has hatches and windows in the nose, tail, back and bottom. Tricycle landing gear is fitted, with a single wheel forward that retracts into the fuselage, and two rear or main wheels that withdraw into wells in the wings.

Each of the four Pratt and Whitney 1,200 h.p. air cooled engines drives a constant-speed airscrew 12 ft. in diameter. The calculated top speed of this formidable bomber is over 300 m.p.h., and sufficient fuel will be carried to give a range of about 3,000 miles. The maximum bomb load will be about three tons. A crew of six to nine men will be carried, depending upon the mission to be performed.

American Rivalry on Transatlantic Air Routes

American Export Airlines have ordered three triple-engined Sikorsky flying boats for their proposed transatlantic air service. Each boat will be equipped to carry 16 passengers and a crew of 11. The company recently applied to the Civil Aeronautics Authority for licenses to operate air services between the United States and Marseilles by both the northern route, which is by way of Botwood, Newfoundland, and Foynes, in Eire, and by the southern one, via the Azores, Lisbon and Biscarosse. Permission for a service to Rome by way of Lisbon and Barcelona also was asked for. Last year the company carried out a series of transatlantic survey flights with a Consolidated 28 flying boat bought for the purpose.

At present Pan American Airways are the only company licensed by the C.A.A. to operate American transatlantic air services. They are reported to be planning to make their service to Lisbon a daily one within a few months.

Truly "Empire"

Almost every R.A.F. flying boat that goes on ocean patrol is an "Empire" boat in the fullest sense of the word. These large aircraft are the military counterparts of the Empire flying boats of civil aviation, and their pilots and crews come from all parts of the Empire.

The captain of one flying boat wears the dark blue uniform of the Royal Australian Air Force, and his second pilot is a New Zealander. The crew includes Englishmen, Scots and Welshmen and one other Australian. In another flying boat the captain is an Englishman, who flies with Scots, Welsh, and Canadians; a third "Sunderland" has a Canadian captain, and his companions are Welsh and English.

The veteran of one Squadron is a South African, who as second pilot has a young Yorkshireman from Doncaster. Another member of the crew, a fitter, comes of a prominent Yorkshire family from whose grounds the young Doncaster officer says he was often chased as a boy.

At one time it was hoped to get all-English, all-Scots, Irish, Welsh, or Canadian flying boats, but the reshuffling caused by expansion has made this impossible. There are already all-Australian flying boats, and there will be more all-Dominion boats when pilots and crews begin to arrive under the Empire training scheme.

Death of a Fine Imperial Airways Pilot

Capt. Frederick Dismore, of Imperial Airways, who died suddenly at Bristol on 17th February last, was justly proud of the fact that although he had flown well over a million miles he had never lost the life of a single passenger. He held a pilot's certificate for 27 years. During the last war he served in the R.F.C. and R.A.F. Afterward he was a pilot for three years with Handley Page Transport, one of the four pioneer air transport firms out of which Imperial Airways was formed in 1924.

Capt. Dismore was the first Imperial Airways pilot to complete 1,000,000 miles of flying, and by the time he celebrated his silver jubilee as a pilot, in August 1938, he had flown 1,250,000 miles in 11,600 flying hours, and had flown across the English Channel at least 4,600 times.

Britannia Trophy Award

The Britannia Trophy is awarded annually by the Royal Aero Club for what is considered to be the "most meritorious performance in the air during the year." The Club announced recently that the Trophy in respect of 1939 has been awarded to Mr. Alex. Henshaw for his record London–Capetown–London flight made in February of that year. On that occasion Henshaw took off from Gravesend aerodrome in his Percival "Gull" light monoplane, and 39 hr. 25 min. later he landed at Wingfield aerodrome, Capetown, having flown non-stop at an average speed of 152 m.p.h. The return flight was almost as good, and was accomplished in 39 hr. 36 min., at an average speed of 151 m.p.h.

Henshaw's success was a triple one, as in addition to setting up new records for solo flights in each direction, he surpassed by 30½ hr. the record for a "there and back" flight set up by Flying Officer A. E. Clouston and Mrs. Kirby-Green on the 14th-20th November 1937. Flying Officer Clouston used his D.H. "Comet" monoplane.

End of the Airship *"Los Angeles"*

The United States airship *"Los Angeles"* is being dismantled, and the metal from her will be sold as scrap. The *"Los Angeles"* was built at Friedrichshafen, Germany, under the designation "Z.R.3," and was flown from there across the North Atlantic to Lakehurst, New Jersey, on 12th–15th October 1924, accomplishing the 5,066 miles flight in 81 hr. 17 min. On this delivery flight she was commanded by Dr. Hugo Eckener, of Zeppelin fame. As a unit of the United States Airship Service the *"Los Angeles"* made about 240 successful flights during her career, and hundreds of officers and men of the United States Army Air Corps were trained in her.

South African Gliding Record

A new soaring height record for South Africa was achieved recently by Mr. G. Dommisse, of Pretoria. He took off from the Rand Airport, Germiston, and reached a height of 12,000 ft. during a flight that lasted 7 hr. 20 min. The only instruments fitted in his glider were an airspeed indicator and a bubble level.

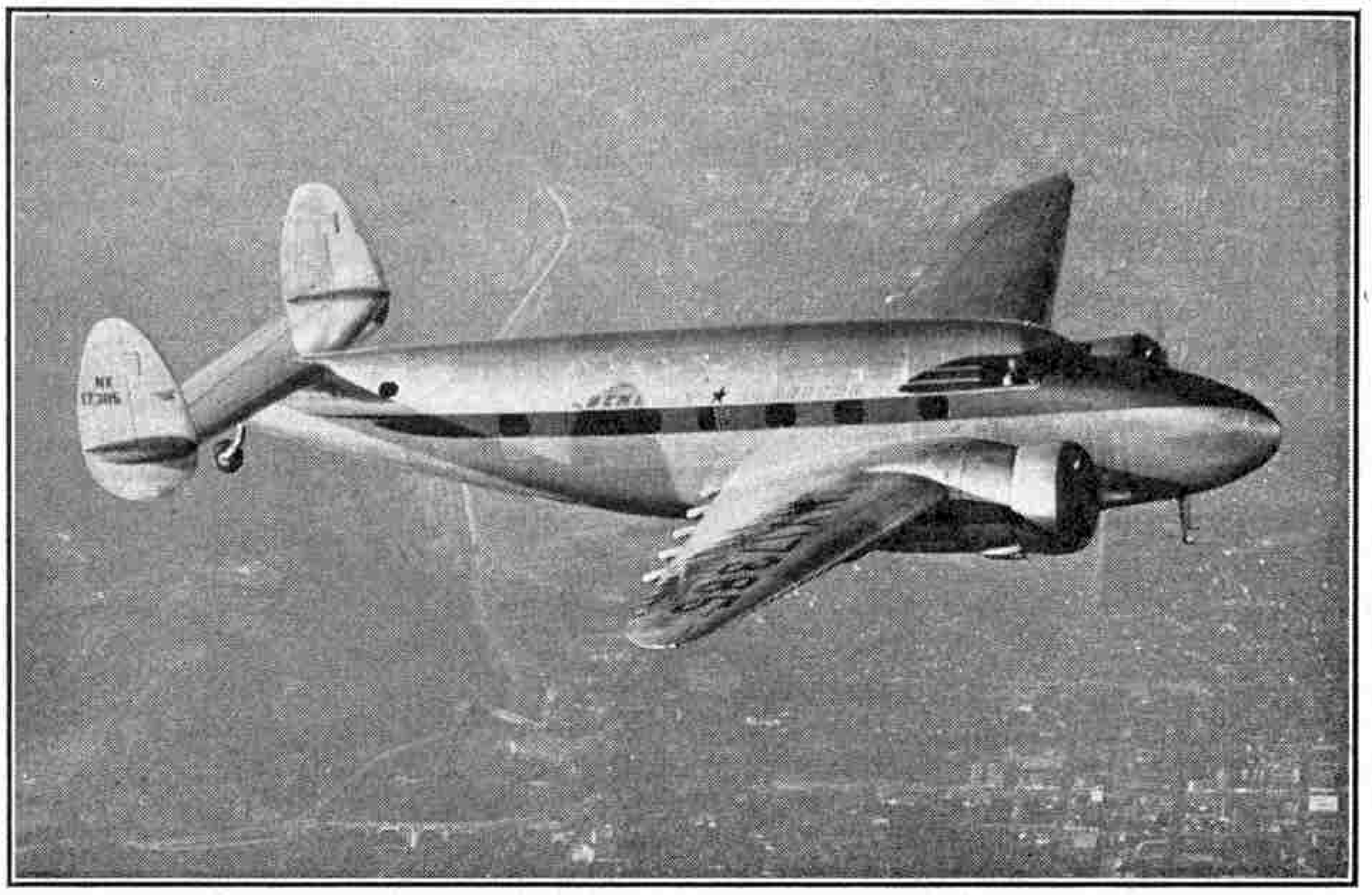
Training Pilots with the Haskard Range

The miniature landscape with moving trains is a familiar object in the children's toy bazaar, but one would hardly expect to find it at an R.A.F. station. Yet many stations and schools of Army Co-operation maintain a most elaborate miniature landscape with more moving devices than were ever found in a toyshop. The installation is known as the Haskard Range, and it is used to train future pilots in tactical and artillery reconnaissance, report writing, pin pointing, and moving target shoots.

The idea of the Range is to give the effect of a landscape as seen from the air. The miniature landscape is in relief, with details painted on canvas, and buildings and trees modelled from rubber sponge. The canvas is 30 ft. square, and represents an area of about 100 sq. miles of country. It is supported by a steel framework 7 ft. above the ground, and contouring is effected by wooden uprights and horizontal strips supported on wires stretched across the framework. The operators can move about beneath the framework, and they can see through the canvas without being seen from above.

The Range is installed in a special building, round the walls of which extends a gallery about 15 in. above the canvas landscape. From this gallery the Range can be observed from any direction, and a man of average height views the model as from a flying height of about 4,000 ft.

Scale models of troops, transport, and trains are moved over the surface of the Range in any direction by means of magnets operated underneath the canvas. An electric smoke box adapted to give imitations of single shell bursts or artillery salvos is used to represent shell bursts on the landscape, and a small electric apparatus is worked from beneath the Range to represent the gun flash of a battery. Several other devices of a more technical nature are employed to give the scene a startling realism. The Range staff consists of an instructor, four wireless telegraph operators, and the two operators under the canvas who work the mechanism.



The first Lockheed "Lodestar" in the air. Three of this new type air liner have been ordered by D.E.T.A. Airlines of Mozambique, South Africa, and each will be equipped to carry 14 passengers and a crew of three. Photograph by courtesy of Lockheed Aircraft Corporation, U.S.A.

Dominions Prefer the R.A.F.

Flying seems to make a special appeal to men from countries where more time is spent out of doors than is possible in England. The R.A.F. still represents the open air life. Farmers from Rhodesia, woodsmen from Canada, clerks from South Africa, and athletic undergraduates from Sydney, Australia, are preparing for their first sight of Europe. Not all the useful work is done aloft, and men from the Dominions who three months ago were concerned only with the engines of tractors and motor cars, are learning how to overhaul aircraft or to take some special place in a ground staff.

French Airport for Transatlantic Landplanes

The airport at Merignac, a few miles from Bordeaux, was planned to form a suitable terminus for giant landplane aircraft to be used on a proposed French transatlantic service. The work has not been completed, but official authority has now been given for it to be carried a stage further by the erection of a third large hangar and the completion of one of two specially designed runways.

An American Giant Reduced

The giant 52-seater Douglas DC-4 liners ordered by the five largest air transport firms in the United States, through the Air Transport Association in that country, will not be built. A revised DC-4 has been designed, and 10 air liners to this new specification have been ordered by one of the companies, United Airlines. Another of the five concerns, Eastern Airlines Inc., are reported to be negotiating for eight revised DC-4s. In its new form the Douglas DC-4 will carry 40 day passengers, and have sleeping accommodation at night for 20 persons. The gross weight will be 50,000 lb. instead of the 66,500 lb. of the original DC-4 sold to a Japanese air company, as mentioned in the January 1940 "*Air News.*"

Eastern Airlines Inc., have also ordered three Douglas DC-3 and three Douglas "Sleeper Transport" air liners. The D.S.T. machines will be equipped to seat 28 passengers by day and provide sleeping facilities at night for 14 people. They will be used on the company's New York–Brownsville, Texas, service. Other companies also have ordered more DC-3s.

Happy Landing

One of the most extraordinary incidents of the war so far is the case of "the air gunner who did not jump." He was the rear gunner of an R.A.F. aircraft that became iced up and unmanageable during a reconnaissance flight. The order was given to "bale out," but the rear gunner did not hear it because his telephone had iced up. His companions obeyed the order, ignorant of the fact that he had not heard it, and as they parachuted to earth they believed that he too had started to float down.

Still at his post, however, the gunner in the tail of the fuselage felt glad that the pilot was making a good course and nearing home! By sheer good fortune the unguided aeroplane finally "pancaked" in safe territory, and the gunner, although badly shaken, rushed as he thought to the rescue of his friends. His consternation when he found that they had disappeared can easily be imagined. He had brought the aeroplane home alone!

* * * *

Figures compiled recently by the Douglas Aircraft Company, U.S.A., show that Douglas transport aeroplanes in service in the United States and other countries fly a total of 425,000 miles every 24 hrs., or a distance equal to a continuous journey of 17 times round the globe every day.



The G.A. "Cygnet," a British two-seater all-metal monoplane fitted with a tricycle type undercarriage. Photograph by courtesy of General Aircraft Ltd.

Forgotten Steel Trails

The Romance of Abandoned Railways

By D. S. Barrie

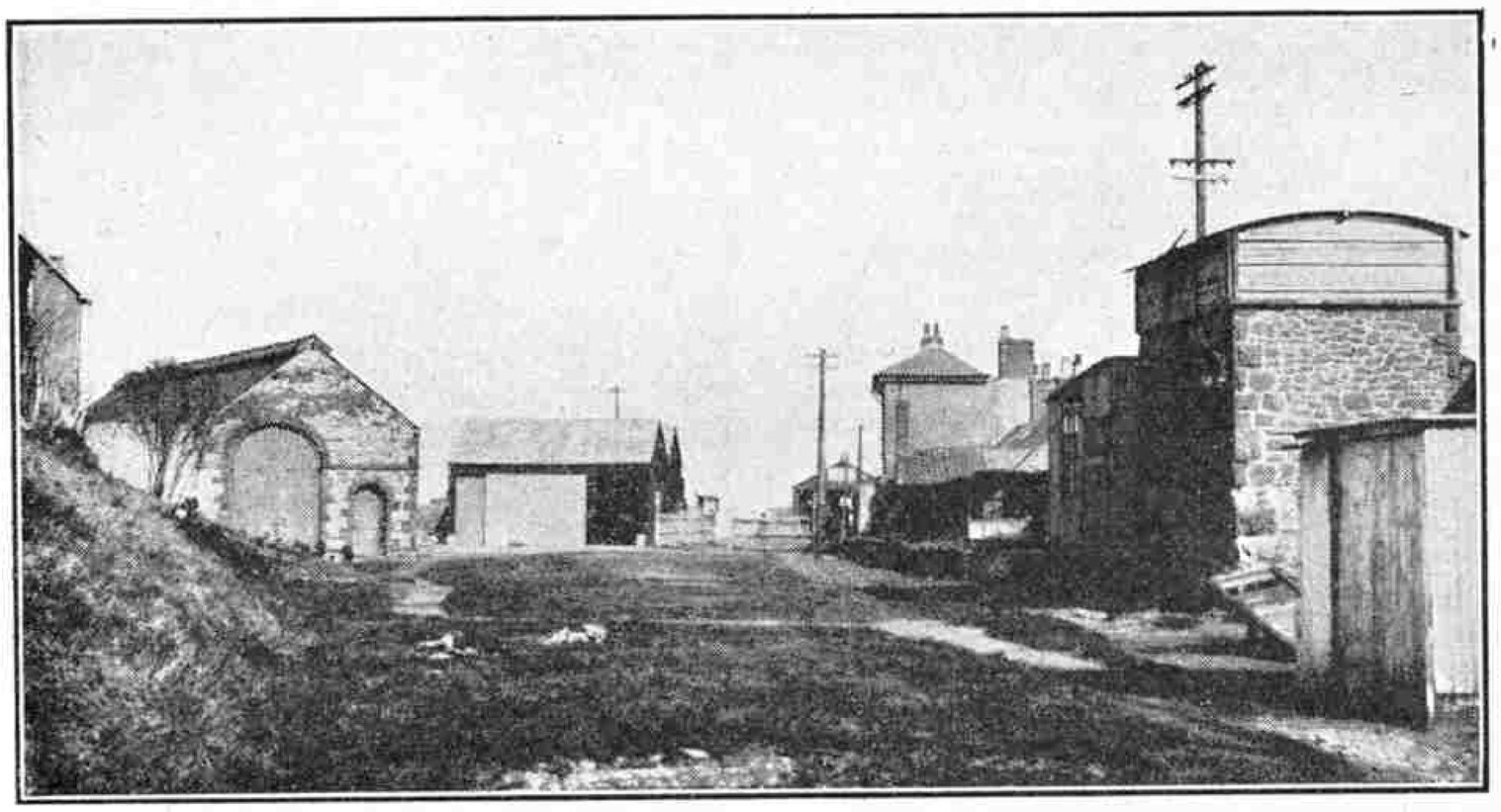
WITH a great national campaign in full swing for the recovery of scrap metal, and with the news that tramway tracks in many parts of the country are to be torn up to contribute to it, many of us are wondering whether history will repeat itself in regard to some of Britain's smaller and little-used railway lines. In the last war, quite a few branch lines of the big companies, together with one or two small independent lines, were closed because they could not pay their way under war-time conditions, and their tracks were torn up and used for military railways, or as scrap.

Perhaps the most outstanding case of this kind was the Basingstoke and Alton Light Railway, which was closed at the end of 1916 and the track dismantled and sent overseas. After the war, the line was relaid and traffic resumed in 1924, but road competition killed the passenger service and the railway "died" a second time, being abandoned in 1936. In its last years it was used for the making of railway scenes in several films, notably "*The Wrecker*" and "*Oh, Mr. Porter.*" The Basingstoke and Alton line was part of the former London and South Western system, and later of course of the Southern Railway; but the "casualties" of the last war included a number of independent lines of light railway type, such as the Pentewan, the Redruth and Chacewater, and the Bideford, Westward Ho! and Appledore. The first-named was of 2 ft. 6 in. gauge and extended from the well-known Cornish china-clay centre of St. Austell to Pentewan Harbour, four miles away on Mevagissey Bay. The track was taken up when the line closed in 1916, but a curious feature was that nearly 10 years after the last war this "railway without rails" was sold to a fresh company, which however, did not resume operations. Like the Pentewan, the Redruth and Chacewater Railway ran inland from a small harbour (Devoran) to an industrial centre, in this case the tin mines round Redruth. The Redruth and Chacewater was one of the earliest of Cornish railways, dating as a horse-worked line from 1825, and being converted to locomotive traction about 30 years later. On the closure of the line in 1915, consequent upon the decay of the tin mines it served, the track was taken up and utilised for war purposes. This railway was one of the few in Great Britain to employ the 4 ft. gauge, a distinction it shared with the Padarn Railway, extending from Port Dinorwic to the Padarn "Llanberis" slate quarries in North Wales. The Padarn line, which in its original form dates from 1824, is still working. Another coastal railway having a gauge of almost 4 ft. (4 ft. $\frac{3}{4}$ in. to be exact) is the Saundersfoot Railway, connecting a small harbour on the Pembrokeshire coast with inland collieries. This also is a very old railway, dating from 1829, though it has not maintained continuous operation.

The Bideford, Westward Ho! and Appledore already mentioned had a working life of less than twenty years before it was closed and the track uplifted in 1915. Of standard gauge, it connected Bideford with Appledore, at the mouth of the Devonshire river Taw, by a roundabout route seven miles in length, and had some characteristics in common with the narrow-gauge Lynton and Barnstaple Railway whose recent abandonment by the Southern Railway caused such a stir among railway enthusiasts.

One of the most historic lines to suffer a similar fate was the Liskeard and Caradon section of the G.W.R., originally built as a horse-worked tramroad to serve the mining area round the Cheesewring and Minions Mound, some ten miles above the Cornish town of Liskeard. This line had enjoyed a working life of more than 70 years when it was closed in 1916, the rails being removed shortly afterwards; the parallel with the Redruth and Chacewater and Pentewan railways will be noted.

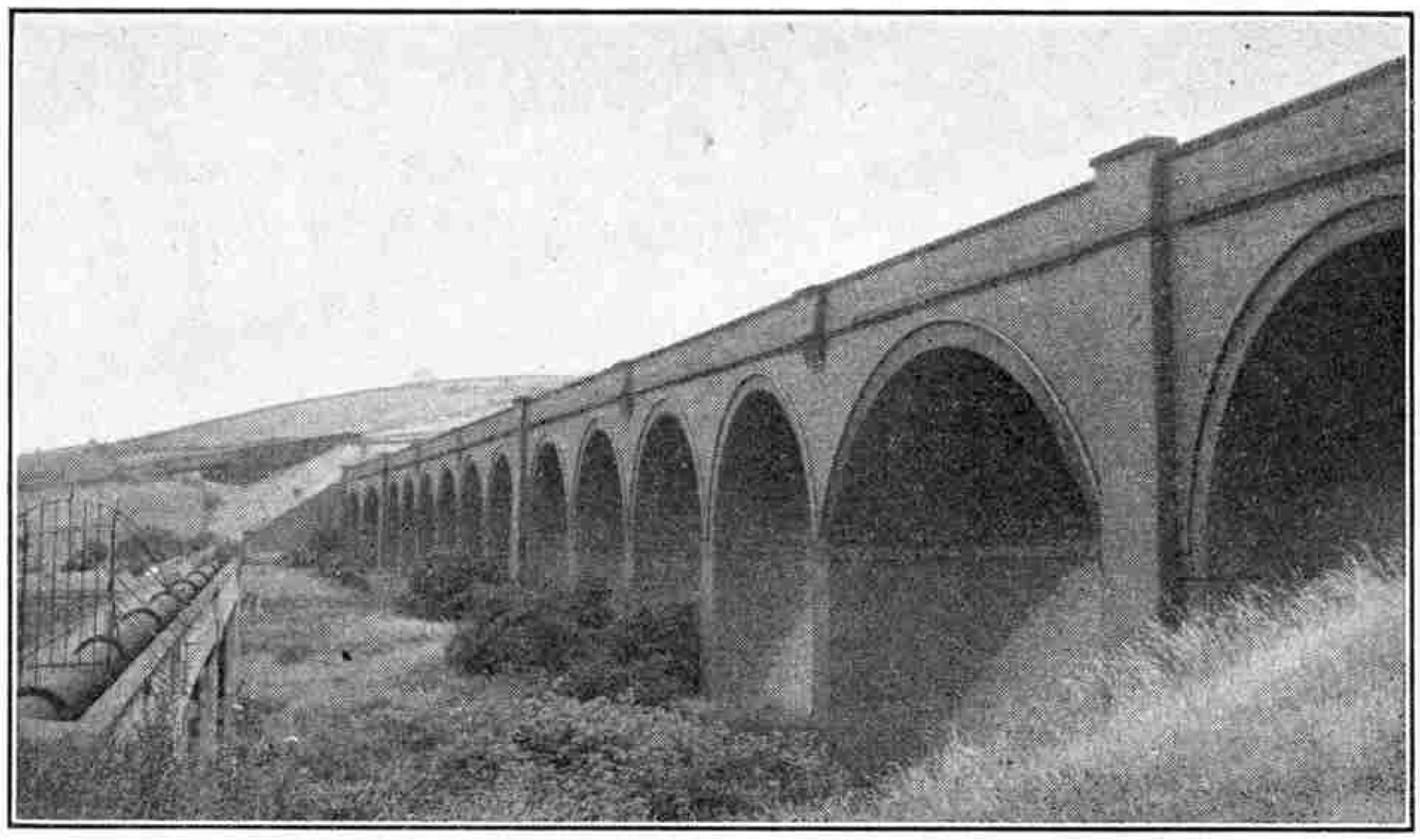
None of Britain's railway abandonments in the last war can compare in spectacular tragedy, however, with the fate of the Colorado Midland Railway ("The Pike's Peak Route") of the United States, which, after a life of 35 years, went out of service in 1918. With the exception of less than 30 miles at the eastern end, taken over by another railway, the whole of the 270 miles of track was torn up, to realise a scrap value greater than the purchase price of the entire concern last time it had changed hands. Scrap metal was commanding fabulous prices in America at the time, owing to the World War. Though it passed through many vicissitudes, the Colorado Midland



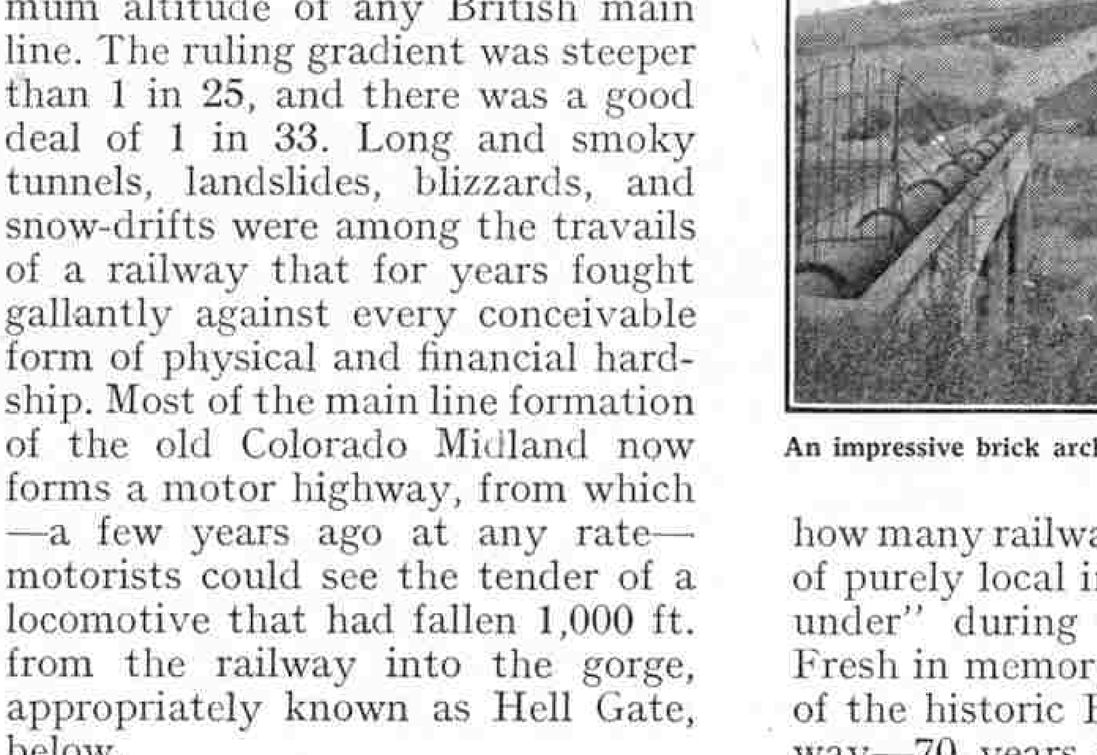
The abandoned terminus of the West Somerset Mineral Railway at Watchet, photographed a few years ago.

was no "jerkwater pike," as the Americans term a small local railway. It formed part of a picturesque if not a principal Transcontinental route across America; it was, in fact, the first United States Railway to penetrate into the heart of the American Rockies, and to do so it had to climb to an elevation of almost 11,000 ft. which is roughly seven times higher than the maximum altitude of any British main line. The ruling gradient was steeper than 1 in 25, and there was a good deal of 1 in 33. Long and smoky tunnels, landslides, blizzards, and snow-drifts were among the travails of a railway that for years fought gallantly against every conceivable form of physical and financial hardship. Most of the main line formation of the old Colorado Midland now forms a motor highway, from which —a few years ago at any rate— motorists could see the tender of a locomotive that had fallen 1,000 ft. from the railway into the gorge, appropriately known as Hell Gate, below.

When it is considered that the total trackage of American railways abandoned during the years 1917-1937 very nearly equals the existing



An impressive brick arch viaduct on the derelict course of the former Midland Railway line between Huddersfield and Mirfield, referred to in this article.



Looking through a derelict tunnel near Hotwells (Bristol) station, on the former Bristol Port Railway. The line ran through the Avon Gorge, and a section of the famous Clifton Suspension Bridge may be seen in the top right-hand corner.

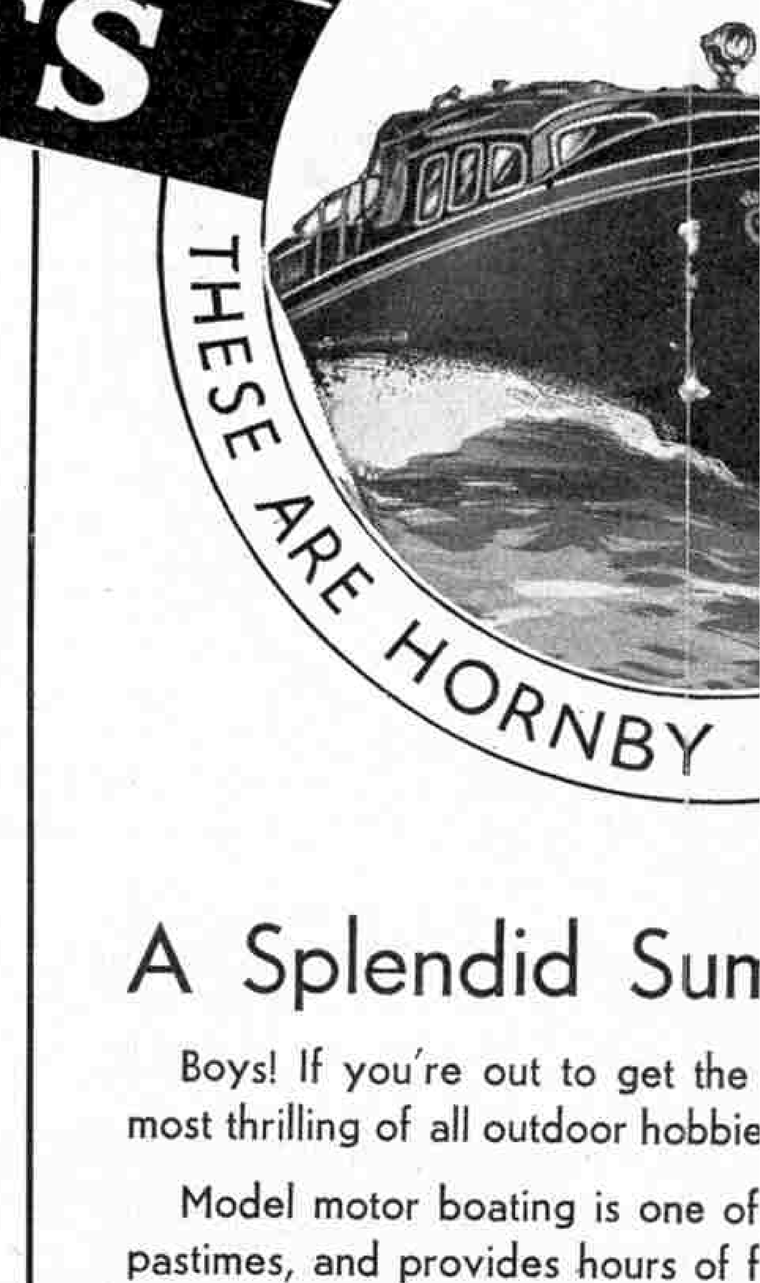
British main line route mileage (19,000-odd miles), it will be realised that there must be some amazing and fantastic stories attaching to these ghost railways of the mountains and prairies. Theirs is another story, however, and the fate of the Colorado Midland has been mentioned only because this was a system whose destruction was in some degree hastened by war-time conditions.

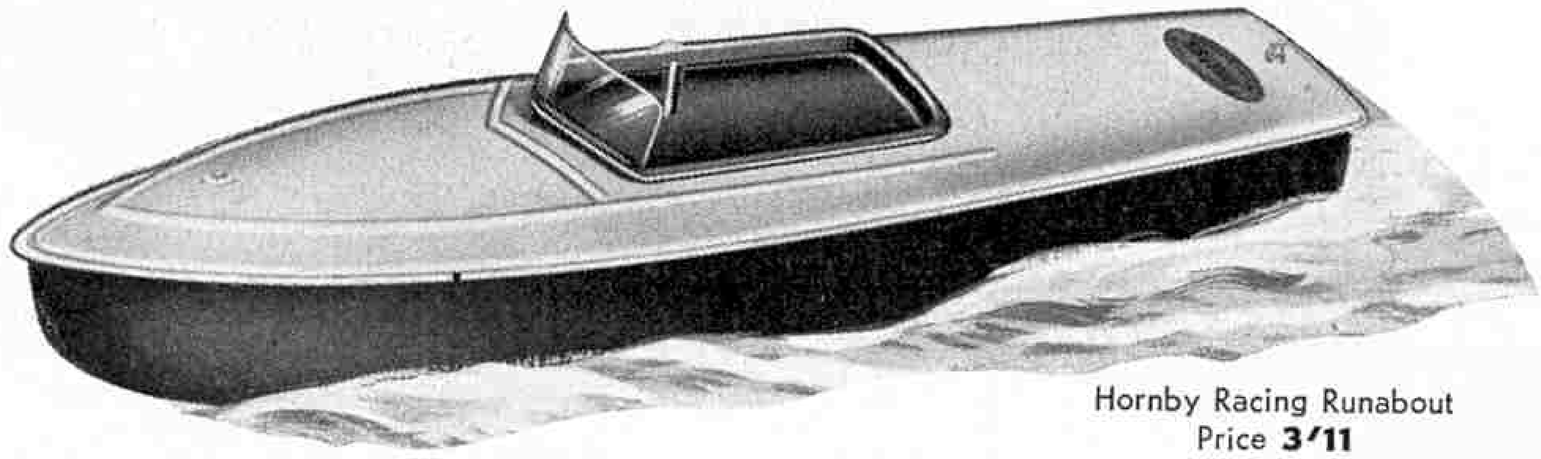
Looking back upon the period of peace between our two wars with Germany, it is surprising to recall how many railways—especially those of purely local interest—have "gone under" during these hectic years. Fresh in memory will be the demise of the historic Bishop's Castle Railway—70 years in Receivership out of its life of 71 years!—which was closed in 1936, and has since been dismantled; the Welsh Highland Railway, now derelict and forlorn as it meanders for 20 miles through the mountains and valleys of Snowdonia; the Solway Junction section of the L.M.S., with its once vast but now dismantled viaduct across the Solway Firth — a railway that realised, generations after his death, George Stephenson's dream of a route from England to Scotland round the West coast. Another notable L.M.S. abandonment was the Manifold Valley light railway, torn up in 1934 and presented by the railway company as a ramblers' footpath, while the closure at the end of 1938 of the L.M.S. Elvanfoot and Wanlockhead section removed the holder of the "highest standard gauge line in Britain" distinction. In reaching the former "Scottish Klondyke" at Leadhills, whence once came the gold for a Scots queen's wedding ring, this line attained an altitude of all but 1,500 ft. above sea level.

There have been picturesque touches, too, about other abandoned English railways. The Bristol Port Railway, between Hotwells (below Clifton Suspension Bridge) and a junction with the main Avonmouth route from Bristol has been removed to make way for the fine motor road Portway, while at any rate until the present war, one of its derelict tunnels was in use as a rifle range. The recent dismantling of the curve between Eamont Junction, on the main West Coast Route near Penrith, and Redhills Junction on the Cockermouth, Keswick and Penrith line, did away with a short section of L.N.E. line isolated from the parent system and connecting two sections of the L.M.S. It was built to enable mineral trains between the North East and North West industrial areas to avoid having to go into Penrith and reverse there.

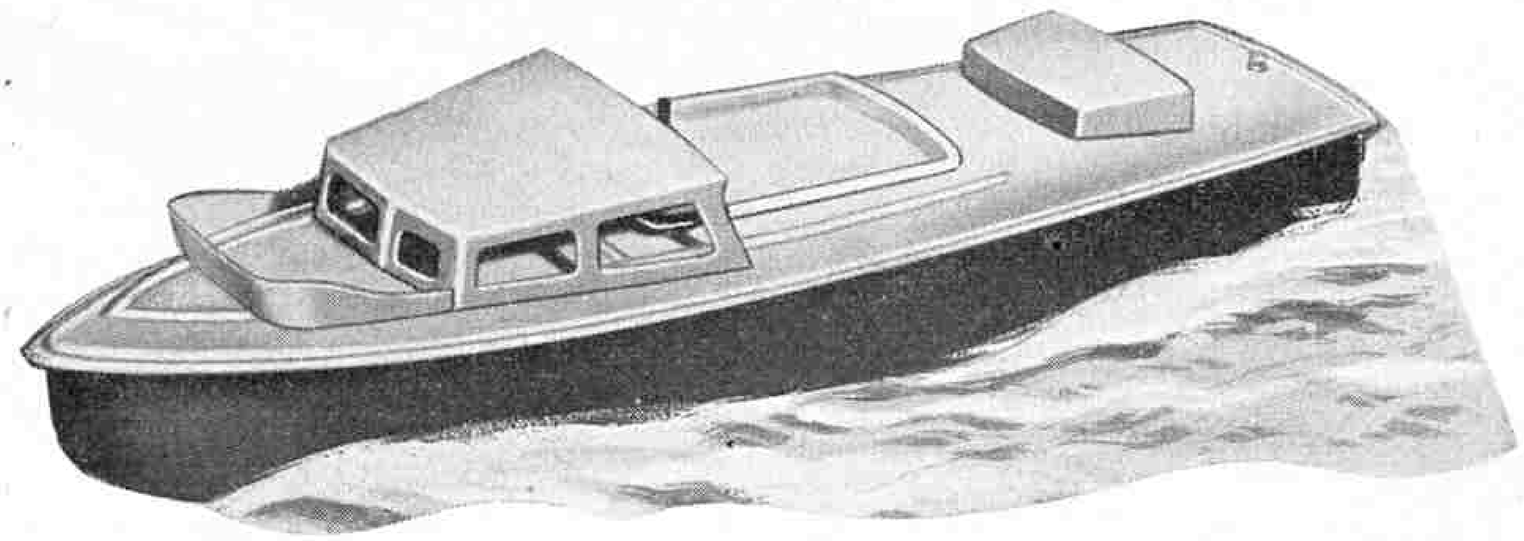
For some time prior to the outbreak of the present war there wa- an intensive "drive" on the part o railway companies and other big industrial concerns to collect and dispose of all realisable redundant assets, such as rails, bridges, turntables and other structures, which could either be used elsewhere or melted down for scrap. The L.M.S. Railway alone realised some 100,000 tons of additional scrap metal by these means, and a notable example on this system concerns a little-known derelict line by which the former Midland Railway gained access to Huddersfield. The Midland, being at all times an ambitious and adventurous company, sought at the end of the last century to cut a new route for itself clean through the West Riding (Continued on page 208)

SPEED BOATS HORN

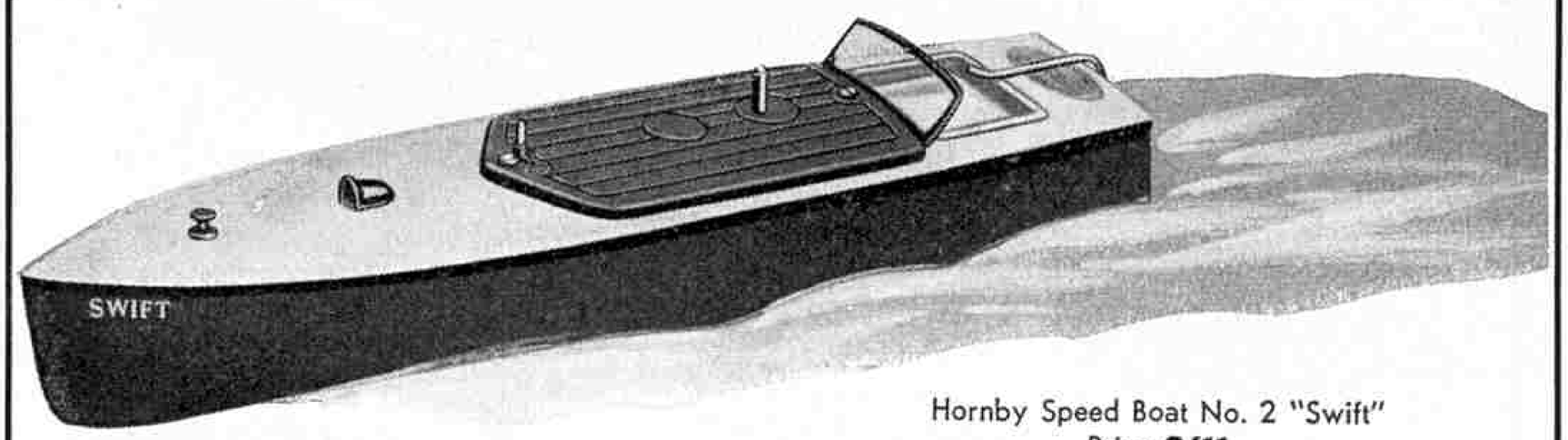




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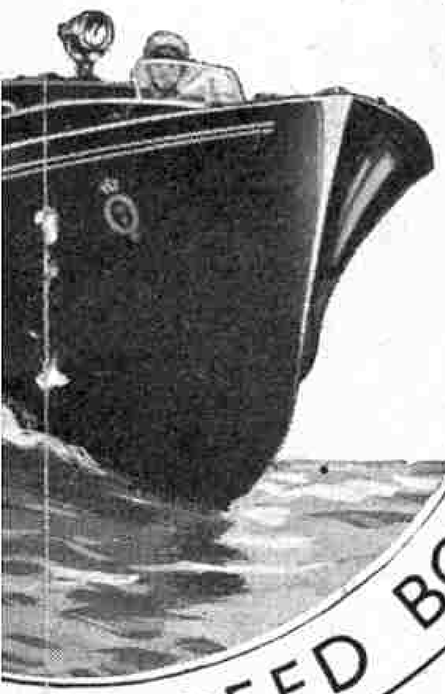
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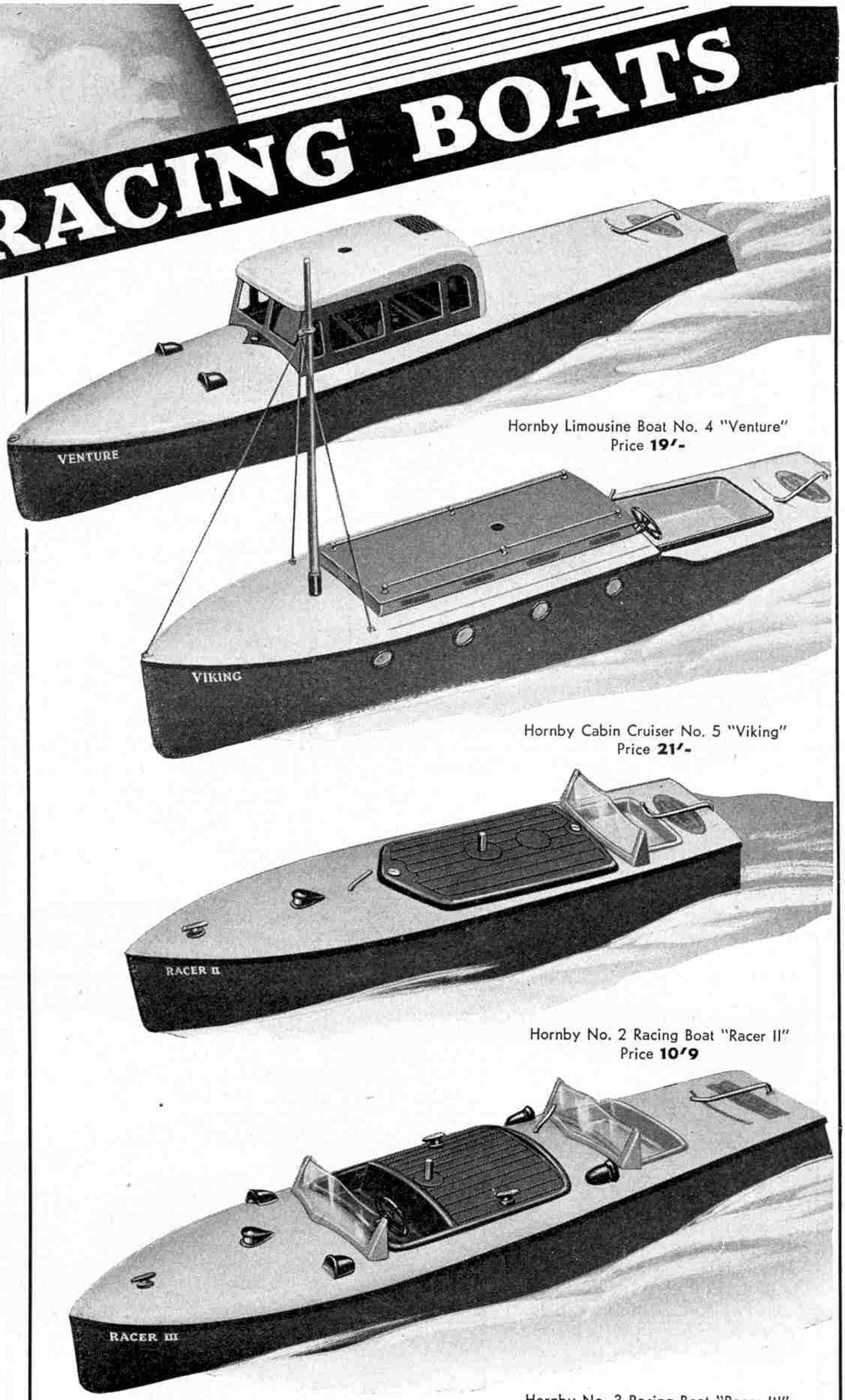
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Hornby No. 3 Racing Boat "Racer III"
Price **17'-**

New Meccano Models

A Simple Loom and a Fine Army Lorry

MANY model-builders have asked for details of a simple model hand loom that can be built from a small Outfit. In response to these requests we include a model of this kind among the four new models we are describing this month. It is shown in Fig. 2, and can be built from the parts in Outfit No. 3. The other three models are a fine army lorry, a simple horse and cart and a working blacksmith operated by a *Magic* Motor. All of these are quite simple and require only a few parts for their construction.

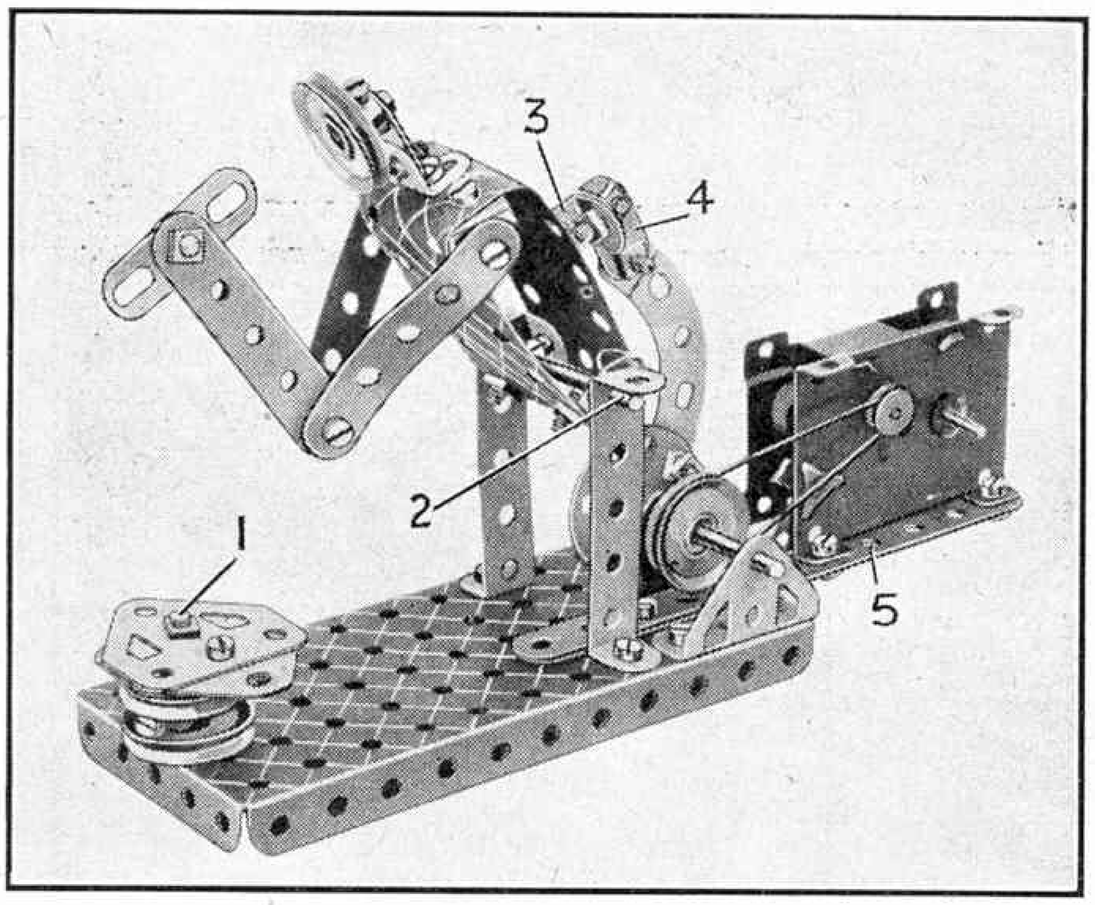


Fig. 1. "The Village Blacksmith." An amusing Outfit No. 1 model that can be set in motion by means of a Magic Motor.

The blacksmith is shown in Fig. 1. The figure is operated by a *Magic* Motor, and when this is set in motion the blacksmith strikes the anvil with real gusto! The model is simple to build and all the parts required with the exception of a 1″ Screwed Rod are contained in Outfit No. 1.

The blacksmith and his anvil are mounted on a base consisting of a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate. The anvil consists of a 1″ Pulley, a 1″ loose Pulley and two Flat Trunnions, held together on a 1″ Screwed Rod 1 as shown. The blacksmith's legs are two $2\frac{1}{2}''$ Double Angle Strips, in the upper end holes of which a 2″ Rod 2 is held. The body is formed from a $1\frac{1}{2}'' \times 5\frac{1}{2}''$ Flexible Plate bent to U-shape, and it is pivoted on the Rod 2 by means of four Angle Brackets bolted one to each of its corners. The Rod passes through the free holes in the Angle Brackets. The arms are $2\frac{1}{2}''$ Strips, and the hammer consists of two $2\frac{1}{2}''$ Strips fitted with two Flat Brackets to form the head.

The blacksmith's head is a 1″ Pulley held on a bolt passed through a Flat Bracket forming his neck. The Flat Bracket is attached to the Flexible Plate by means of an Angle Bracket. At the back of the body is bolted a 1″ Reversed Angle Bracket 3, and this is used to attach the blacksmith to the operating mechanism. An Angle Bracket is bolted to the free arm of the Reversed Angle Bracket and this in turn carries a Flat Bracket 4. The Flat Bracket is pivotally attached by a lock-nutted bolt through its free hole to one end of a $2\frac{1}{2}''$ Curved Strip, the other end of which is similarly lock-nutted to a Bush Wheel. The Bush Wheel is mounted on a 2″ Rod journalled in Trunnions bolted to the Flanged Plate. The Rod carries a 1″ Pulley. Care must be taken to see that the Curved Strip pivots quite freely on its bolts and is not fixed tightly in position.

A *Magic* Motor is bolted to two $5\frac{1}{2}''$ Strips 5 placed face to face and fixed to the base so as to project from one end, as shown. The drive from the small pulley of the Motor is transmitted to the 1″ Pulley by means of a Driving Band.

Parts required to build the model Blacksmith: 2 of No. 2; 4 of No. 5; 4 of No. 10; 8 of No. 12; 2 of No. 17; 3 of No. 22; 1 of No. 22c; 1 of No. 24; 24 of No. 37a; 25 of No. 37b; 2 of No. 35; 2 of No. 48a; 1 of No. 52; 1 of No. 82; 2 of No. 111c; 1 of No. 125; 2 of No. 126; 2 of No. 126a; 1 of No. 186; 1 of No. 189; 1 *Magic* Motor (not included in Outfit).

The Hand Loom shown in Fig. 2 should be commenced by building the base. This consists of a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate mounted on two $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates fixed at each side between the flanges of the Flanged Plate and $12\frac{1}{2}''$ Strips. Two $5\frac{1}{2}''$ Strips are attached to the $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate, and between their outer ends they clamp $1\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates to vertical

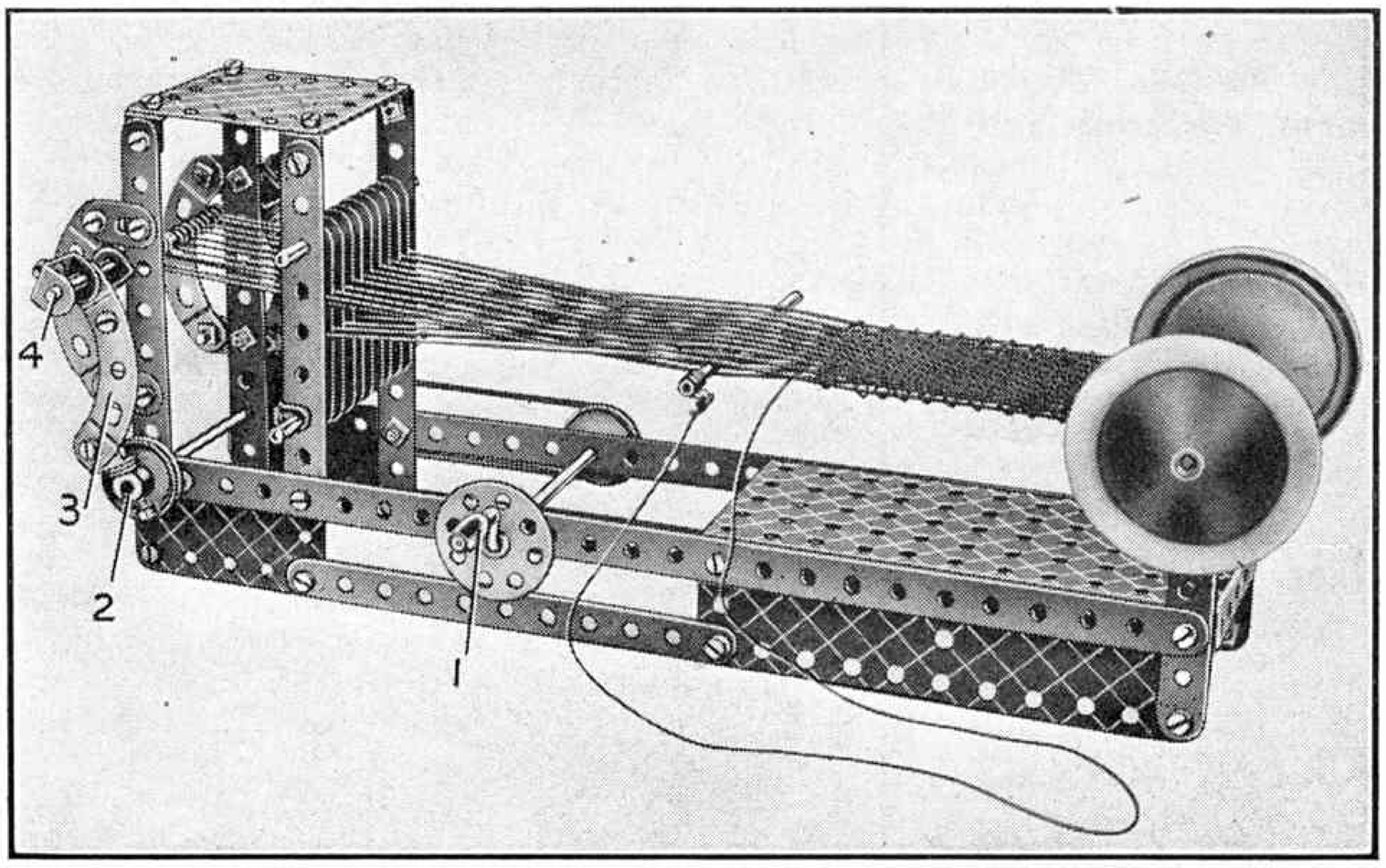


Fig. 2. A simple Hand Loom. This model can be built from the parts in Outfit No. 3.

$5\frac{1}{2}''$ Strips. The upper edges of the $1\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates are bolted to the $12\frac{1}{2}''$ Strips already mentioned. An Axle Rod carrying at each end a Road Wheel is journalled in two vertical $5\frac{1}{2}''$ Strips at the front of the model.

Construction of the warp separating arrangement at the other end of the machine is commenced by attaching two $2\frac{1}{2}''$ Curved Strips to the rear pair of vertical $5\frac{1}{2}''$ Strips in the manner shown in the illustration, by means of two Flat Brackets. Nine $2\frac{1}{2}''$ Strips separated from each other by Spring Clips are then placed vertically between the middle pair of vertical $5\frac{1}{2}''$ Strips and a $3\frac{1}{2}''$ Axle Rod is pushed through their end holes as shown. The Rod 4 is passed between the Curved Strips,

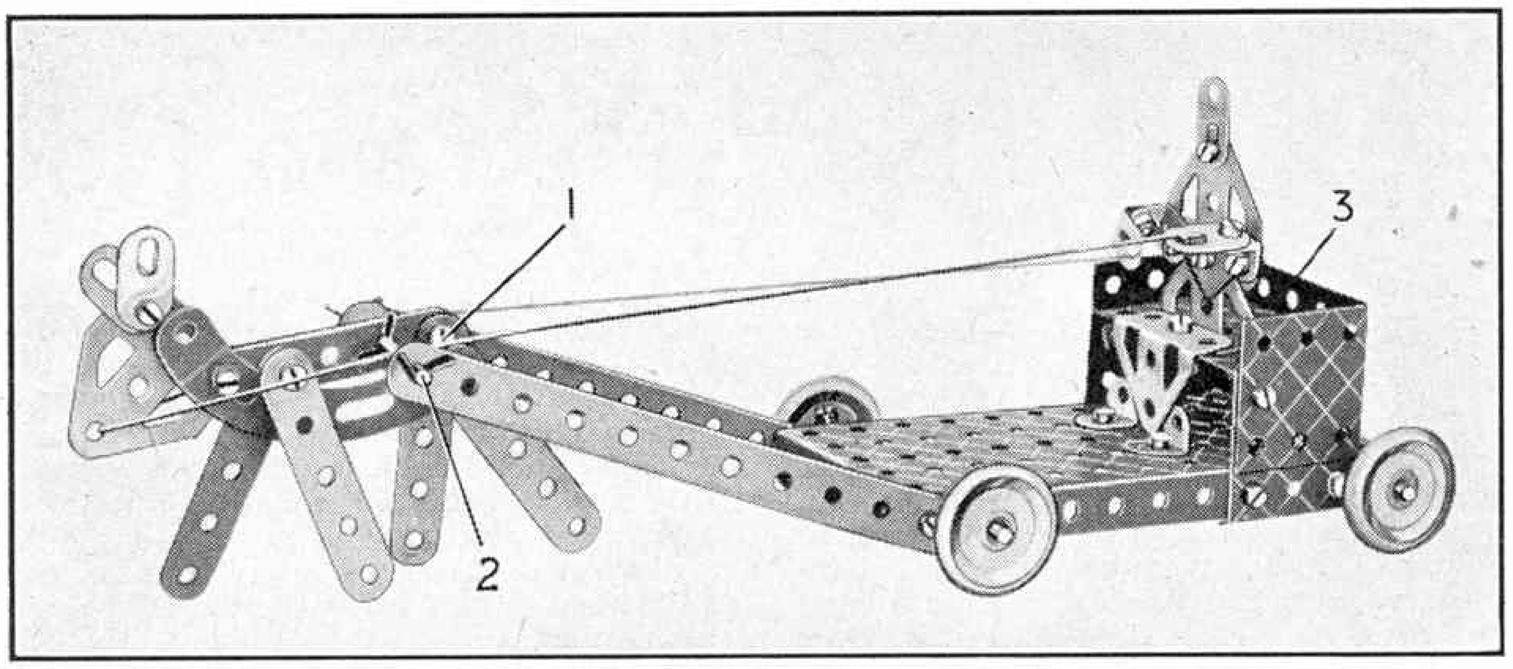


Fig. 4. All the parts required to build this model Horse and Cart are contained in Outfit No. 1.

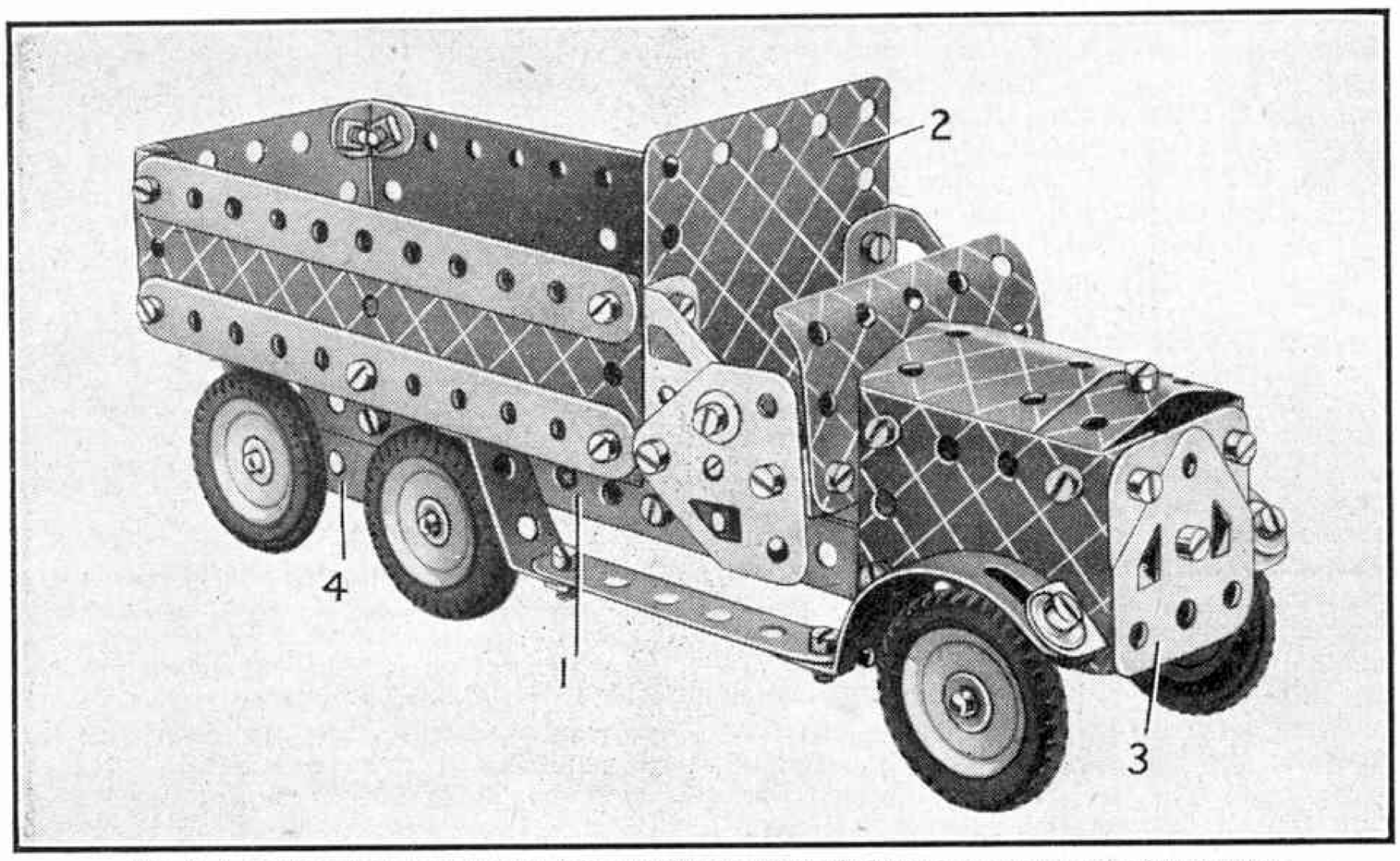


Fig. 3. A sturdy model Army Lorry, a fine subject for model-builders interested in wheeled vehicles.

each end of it being secured by means of a Reversed Angle Bracket to a $2\frac{1}{2}''$ Curved Strip 3, which is kept in position by two Double Angle Brackets. The other ends of the Curved Strips are attached by means of Angle Brackets to the bosses of two 1" Pulley Wheels locked on each end of the Rod 2.

The warp separating movement is operated by turning a Crank Handle 1 journalled in the $12\frac{1}{2}''$ Strips of the base as shown. The Crank Handle is held in place by a Bush Wheel at one end and a 1" Pulley at the other. A Driving Band connects this 1" Pulley with a second Pulley on the Rod 2.

Parts required to build model Loom: 2 of No. 1; 6 of No. 2; 2 of No. 3; 9 of No. 5; 4 of No. 10; 2 of No. 11; 2 of No. 12; 2 of No. 15b; 3 of No. 16; 2 of No. 17; 1 of No. 19g; 3 of No. 22; 1 of No. 24; 6 of No. 35; 38 of No. 37a; 40 of No. 37b; 6 of No. 38; 1 of No. 40; 2 of No. 48a; 1 of No. 52; 4 of No. 90a; 2 of No. 125; 1 of No. 186; 2 of No. 187; 2 of No. 188; 2 of No. 189; 1 of No. 190; 1 of No. 213.

The sturdy model lorry shown in Fig. 3 is based on the heavy transport wagons used in the British Army. The chassis consists of two side members 1, each of which is formed from two $5\frac{1}{2}''$ Strips overlapped five holes and bolted together. The side members are joined at their centres and rear ends by $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips, and to the centre one of these the $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate that forms the lorry body is attached. The rear of the Flanged Plate is attached by Angle Brackets to the side members.

The sides and rear of the body consist of two $5\frac{1}{2}'' \times 2\frac{1}{2}''$ and one $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate, and are bolted in position together with the $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate 2, which forms the back of the driving seat. The sides of the bonnet are built up from two $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates bolted to the side members 1 and connected at the front by the Flat Trunnions 3 that form the radiator. The bonnet top also consists of $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates, which are overlapped as shown.

The sides of the cab are formed by Flat Trunnions fixed to Plate 2 by Trunnions. The Flat Trunnions are connected by a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip, to which a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate that has been curved slightly is bolted to form the front of the cab. The six road wheels are 1" Pulleys fitted with 1" Motor Tyres. The rear axles are journalled in two $2\frac{1}{2}''$ Strips 4. These Strips are pivoted through their centre holes on lock-nutted bolts, which pass through Flat Brackets bolted to the chassis. This arrangement forms a pivoted bogie and allows the wheels to ride easily over irregularities in the ground, in very much the same manner as the independently sprung axles of the prototype. The front axle is journalled directly in Flat Brackets bolted to the chassis.

A *Magic* Motor forms an ideal power unit for a wheeled model of this kind and if one is available it should be fitted under the chassis and connected by a Driving Band to a Pulley on the front axle.

Parts required to build the model Army Lorry: 8 of No. 2; 2 of No. 4; 3 of No. 5; 2 of No. 6; 4 of No. 10; 8 of No. 12; 3 of No. 16a; 6 of No. 22; 58 of No. 37a; 56 of No. 37b; 4 of No. 38; 2 of No. 48; 1 of No. 48a; 1 of No. 52; 2 of No. 124; 2 of No. 126; 4 of No. 126a; 6 of No. 142c; 6 of No. 188; 2 of No. 189; 1 of No. 190; 2 of No. 215.

The remaining model to be described is the simple Horse and Cart shown in Fig. 4. The horse's head is a Flat Trunnion and Flat Brackets are used to represent ears. His body is a $2\frac{1}{2}''$ Strip bolted to a $2\frac{1}{2}''$ Curved Cranked Strip. His legs are $2\frac{1}{2}''$ Strips. His forelegs are spaced apart by three Washers and his hind legs by a Reversed Angle Bracket. One of the bolts holding the Bracket is shown at 1, and the other passes through the left-hand hind leg.

Parts required to build the Horse and Cart: 5 of No. 5; 4 of No. 10; 5 of No. 12; 2 of No. 16; 1 of No. 17; 4 of No. 22; 1 of No. 24; 4 of No. 35; 20 of No. 37; 3 of No. 38; 1 of No. 90a; 1 of No. 125; 2 of No. 126; 2 of No. 126a; 4 of No. 142c; 2 of No. 189.

Suggestions Section

By "Spanner"

(470) Triplicated Crankshaft

("Spanner")

This "suggestion" is a reproduction of a special formation of cranks designed primarily for use in connection with certain types of oil engines. In these engines each cylinder contains two pistons that work in opposite directions to each other, although both are actuated simultaneously. One piston moves downward as the other moves upward, the movement of each piston being reversed for every cycle of operation. The pistons are coupled up to the crankshaft by means of three connecting rods, the two outside connecting rods working in unison as they are attached to the upper piston. A threefold crankshaft mechanism

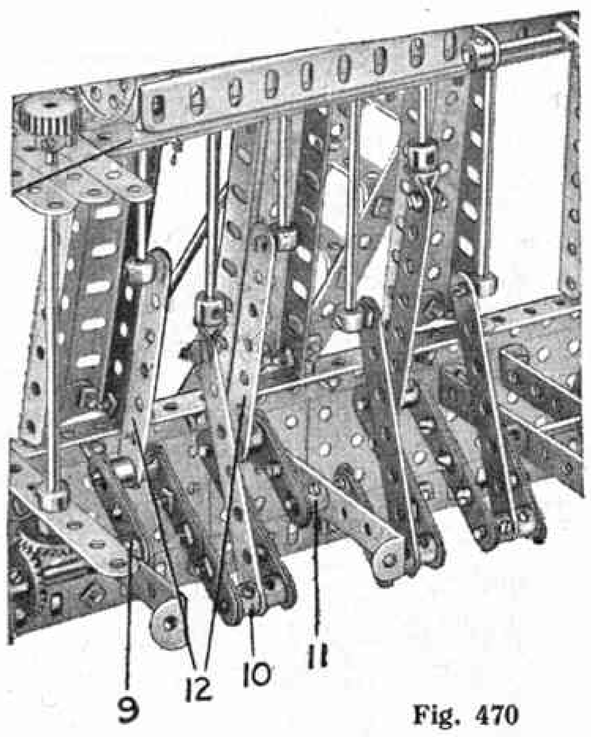


Fig. 470

of this kind may be built up on a small scale, and incorporated in model marine or car engines or other similar movements.

The main section of each crank consists of two separate webs, each of which is constructed from two $2\frac{1}{2}''$ Strips bolted together and two Cranks. The Cranks are bolted to opposite sides of the Strips at each end. At the point 10 the two webs are joined rigidly by a 1" Rod, a $3\frac{1}{2}''$ Strip being carried on the Rod between the two Cranks. This Strip is coupled to an End Bearing on the bottom end of the lower piston rod by a $\frac{3}{8}''$ Bolt, which is held in place by lock-nuts.

Each of the small webs 9 and 11 is built from two Cranks and two $1\frac{1}{2}''$ Strips, the entire assembly being secured together by a single nut and bolt. These webs are attached to the unoccupied ends of the larger cranks by means of 1" Rods carrying $3\frac{1}{2}''$ Strips 12 in a similar manner to that already described. They are also pivotally attached to the lower ends of $11\frac{1}{2}''$ Rods by bolts carried in the threaded transverse holes of Collars. The upper ends of the $11\frac{1}{2}''$ Rods are joined by short Strips, the centres of which are connected by a Coupling to the upper piston rod.

(471) Developing Tank Agitator

(R. Glenfield, Jedburgh)

Now that brighter days are returning amateur photographers will be getting busy again, and those who carry out the developing and printing processes themselves will find the apparatus shown in Fig. 471 a useful addition to their darkroom equipment. It is essential when processing films, plates or papers, to keep developing or fixing solutions in constant movement, so as to prevent the formation of air bubbles and the risk of patchy negatives. In Fig. 471 is illustrated an easily built agitator for the cylindrical type of processing tank designed to accommodate the film in spiral grooves.

The frame of the apparatus consists essentially of two $12\frac{1}{2}''$ Angle Girders connected by three $5\frac{1}{2}''$ Angle Girders. At one end of the frame a $5\frac{1}{2}''$ Angle Girder carries a $2\frac{1}{2}'' \times 1''$ Double Angle Strip, the ends of which are connected by a $2\frac{1}{2}''$ Strip. A second rectangular frame 1 is now made from $5\frac{1}{2}''$ Angle Girders braced with $5\frac{1}{2}''$ Strips. The Strips are fitted with Threaded Pins, which serve to hold the developing tank in position. The frame 1 is hinged at one end to the $2\frac{1}{2}''$ Strip 2, bolted across a Double Arm Crank. The latter is pushed on a vertical $2\frac{1}{2}''$ Rod 5, but is spaced from the Double Angle Strip by a $\frac{1}{2}''$ loose Pulley.

The agitator is operated by an E06 or E020 Electric Motor, which is supported between the two Flanged Plates by $3\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips. A Worm on the armature shaft of the Motor drives a 50-teeth Gear on the $4\frac{1}{2}''$ Rod 5, which is fitted with a Universal Coupling. In the other end of the Coupling is a 1" Rod, and on this is a Triple-Throw Eccentric 6, the arm of which is fixed to the frame 1 by a lock-nutted bolt. When the Motor is set in motion, the Eccentric imparts a peculiar circular movement to the frame, and this effectively circulates the solution round the film.

Some modern developing tanks have a knob at the top so that agitation can be carried out by hand. This knob allows the film spool to be rotated, and as the spool has a special cam at the bottom it also rises up and down. A tank of this kind can be agitated mechanically if it is clamped in a frame built up from Meccano parts, so that

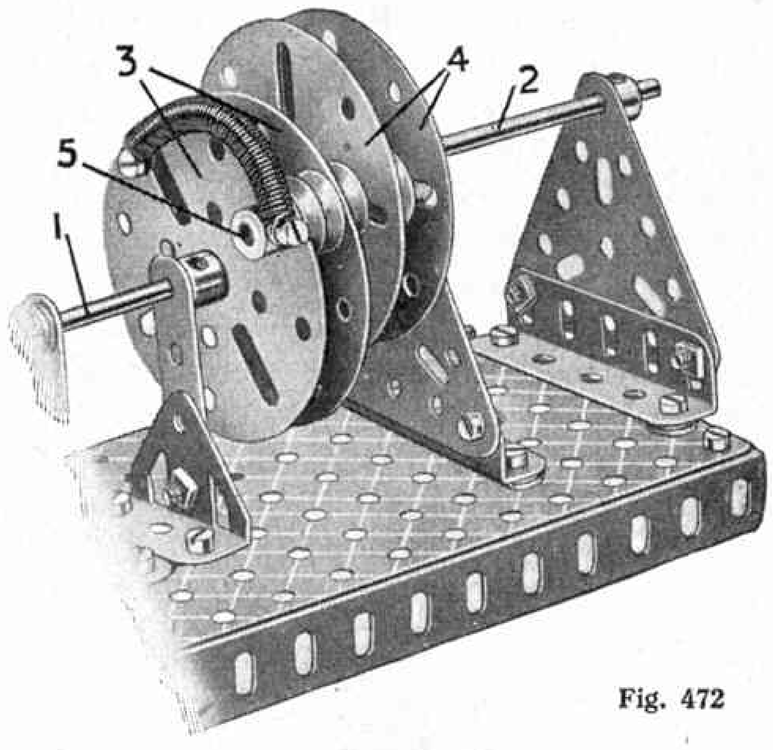


Fig. 472

the knob can be rotated by means of a Driving Band passed around the Pulley of a Motor. In this case a Clockwork Motor can be used for the driving unit, and if it is fitted with a fan air brake it will operate the agitator for periods up to 15 minutes on one winding. The fan of course should be driven through step-up gearing.

(472) Quick Return Motion

(N. C. Speech, Birmingham)

In some machines, for example, planing and slotting machines, quick return mechanisms are incorporated for the purpose of speeding up operations by increasing the speed of the return or idle stroke of the cutting tool. They can be used also for intermittent feed movements in which a Pawl is used for rotating a Ratchet Wheel. In this case the arm carrying the Pawl would be speeded up on the return stroke so that the interval between successive movements of the Ratchet would be decreased.

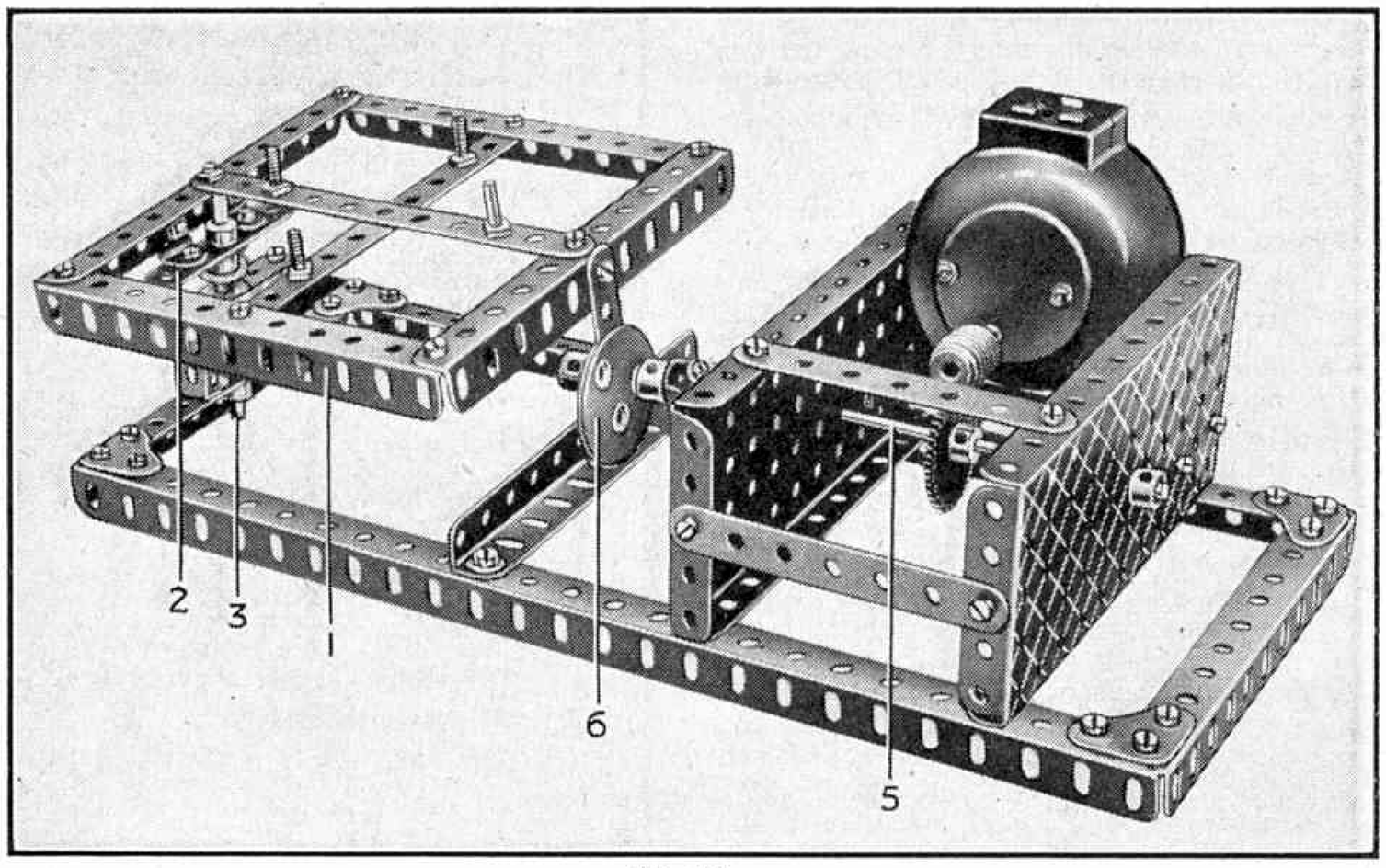


Fig. 471

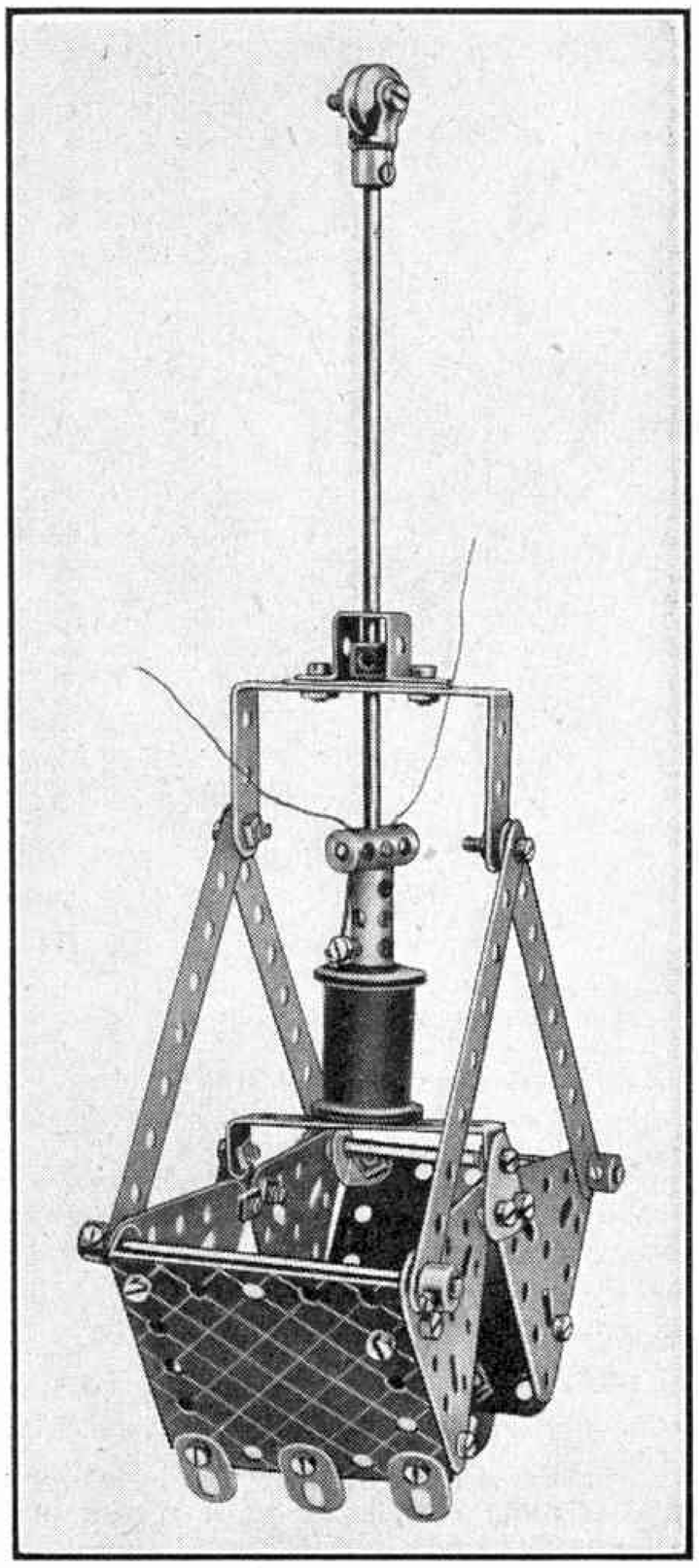


Fig. 474

Many different types of quick return motions have appeared in "*Suggestions Section*" from time to time, and a further interesting example is shown in Fig. 472. This movement is of special interest, as it is a distinct departure from the usual lever or gear-operated quick return movement. Its action is controlled by a spring, and therefore is quick and positive.

Construction of the mechanism is carried out in the following manner. The driving shaft 2 is journalled in two 2½" Triangular Plates secured in the slotted holes of 2½" Angle Girders, which are spaced from the base plate by two Washers on each securing bolt. The bearings for the driven Rod 1 are formed by 2" Strips held in Trunnions. The two sets of bearings should be so arranged that the centres of the Rods are exactly ½" apart, and it is essential that the Rods should be parallel to each other.

Two Face Plates 3 are secured on the Rod 1 and spaced apart about ⅜", with the slots in each Plate directly opposite. The Face Plates 4 are mounted in a similar manner on the Rod 2, and a 1½" Rod 5 is passed through slots in each pair of Plates. The Rod carries five ½" loose Pulleys arranged as shown, and a Collar on each end of this Rod holds it in position. The Face Plates should be spaced so that the Pulleys slide freely. A Spring that controls the movement of the gear is fitted to one end of the Rod, and the other end of the Spring is secured by a ⅜" Bolt to one of the Face Plates 3.

The drive from the Rod 1 passes through the Face Plates to the Rod 2 by means of the Rod 5. This Rod slides up and down in the slots, so that in its lowest position it is at the lower ends of the slots in the Face Plates 3, and at the upper ends of the slots in the Face Plates 4. Thus the Rod 2 rotates faster than the Rod 1, but as the Plates continue to rotate the difference in speed of the two Rods is gradually reduced, while in the second half revolution Rod 1 rotates more quickly than Rod 2.

(473) Synchronous Motor

(G. Woolfenden, Liverpool)

Figs. 473 and 473a show a synchronous motor built up from Meccano parts. The model is exceptionally robust, and is designed to work from a Meccano 6-volt Transformer connected to 50 cycle A.C. mains.

Construction is commenced by winding eight Meccano Bobbins to capacity with No. 23 gauge enamel covered wire. These are then wired together in series, and the free ends of the first and eighth coils are taken to Terminals on the 1" Triangular Plate shown in Fig. 473. Each coil is held in a built-up yoke, each half of which is constructed from two Angle Brackets and a Flat Bracket held on a ½" Bolt as shown. Washers are placed on each side of the Flat Bracket to space it centrally between the Angle Brackets.

The units are then connected together by means of 1" Screwed Rods passed through the Angle Brackets of each unit and a Rod Socket as shown, and held in place by means of a nut on each end. The Coils are then slipped in the yokes and the nuts on the Screwed Rods are tightened up. Insulation in the form of sheet fibre or a wrapping of brown paper should be placed around the Bobbins to prevent the possibility of short circuiting.

The units are then linked together by means of the Flat Brackets, as shown. Finally, an Angle Bracket and a 1½" Strip are slipped on the threaded shank of each Rod Socket, and the other end of the Strip is bolted to a Face Plate by ½" Bolts, a Washer and a Collar being placed on the underside.

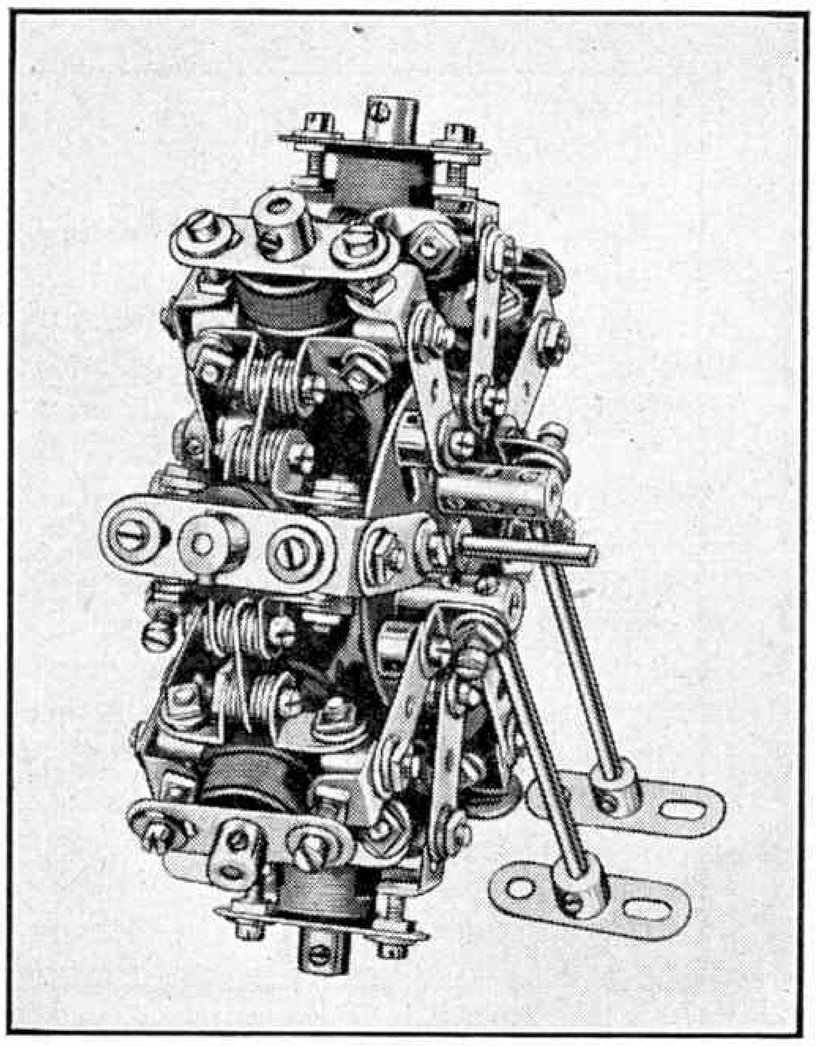


Fig. 473a

The rotor consists of a 3" Sprocket Wheel mounted on a 3½" Axle Rod, which rotates in the bores of the two Face Plates. Care must be exercised in aligning the bosses of the Face Plates, and the various nuts and bolts should not be tightened up until the Rod runs quite freely.

The Angle Brackets attached to the 1½" Strips are connected by ½" Bolts to Double Arm Cranks, through which 1½" Axle Rods are pushed. These Rods form the cores of the magnets, and their inner ends should be as near as possible to the teeth of the Sprocket Wheel.

If the Bobbins are wound as described the motor is suitable for working from any of the 6-volt Meccano Transformers. To start it the rotor spindle should be spun at approximately 100 r.p.m., which is its normal working speed.

(474) Electro-Magnetic Grab

(P. Hands, Hillingdon)

An electro-magnetic grab fitted to a Meccano crane will greatly increase the fun and pleasure obtained from operating it. A simple method of constructing such a grab is shown in Fig. 474. The principal feature of this device is that only one cord is used for hoisting and lowering and opening and closing the jaws.

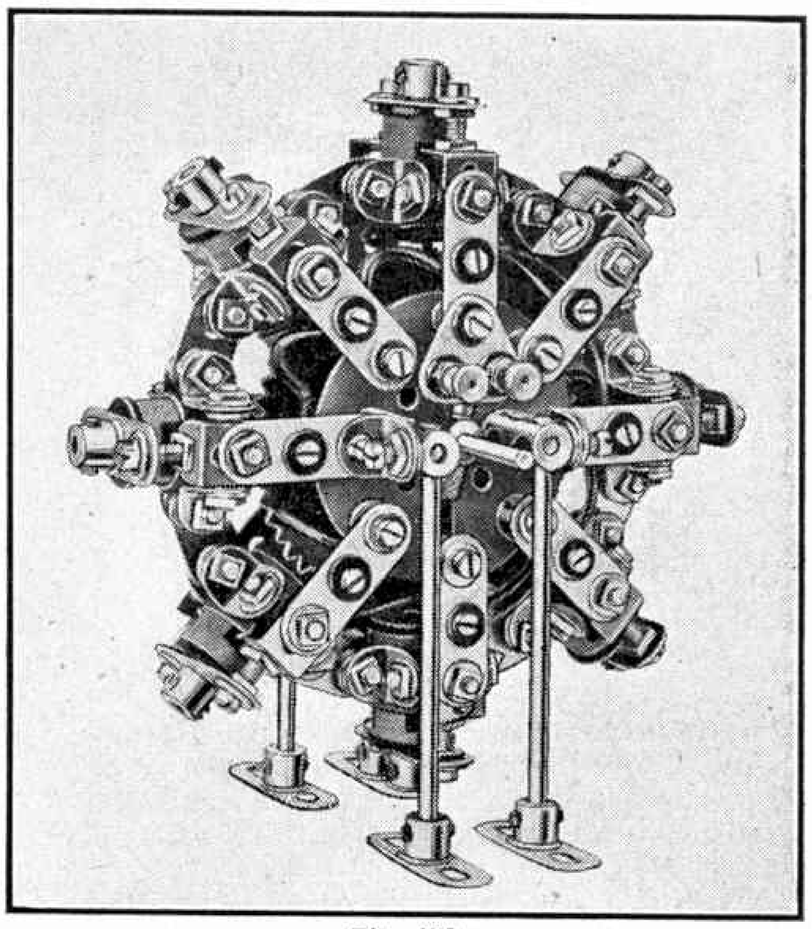


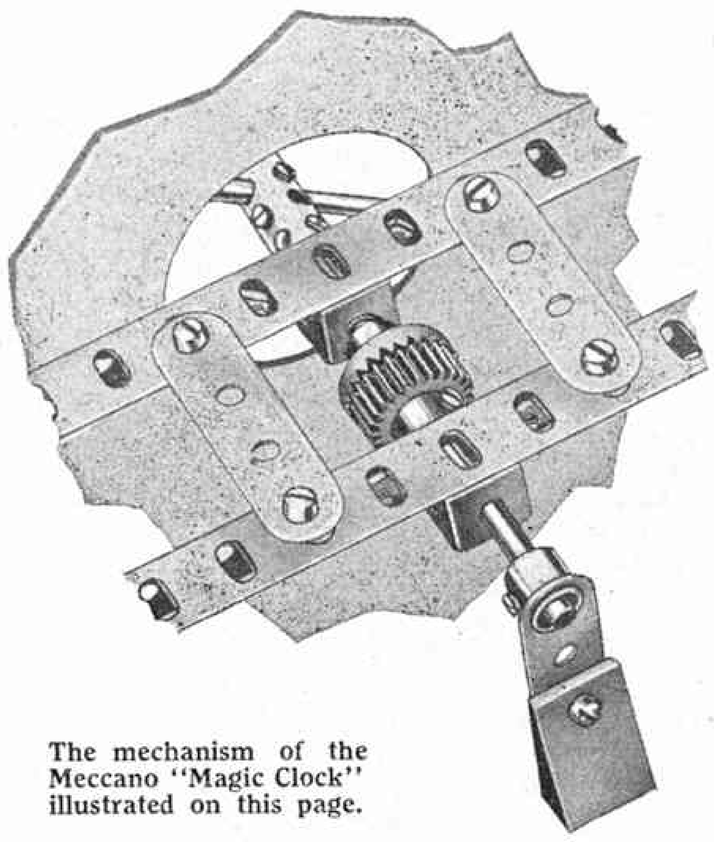
Fig. 473

Four 4½" Strips are pivoted on 3" Rods pushed through holes in the 2½" Triangular Plates, and are held in place by Collars as shown. The upper ends of the Strips are pivotally connected by lock-nutted bolts to a 2½" × 1½" Double Angle Strip. To the centre of this Double Angle Strip is bolted a Double Arm Crank and a Double Bent Strip as shown. A 6" Rod, which at its lower end carries a Coupling, is passed through the centre holes in the Double Bent Strip, Double Arm Crank and Double Angle Strip. The Coupling on this Rod is connected to an Elektron Electro-Magnet, which has a tightly-fitting Core, and is held in place by the grub screws in the lower end of the Coupling. The 6" Rod must not touch the Core of the Magnet. Above the first Coupling is a second similar part placed at right angles to the first Coupling. At the upper end of the 6" Rod is a Small Fork Piece, between the arms of which is mounted a ½" loose Pulley around which passes the hoisting and grab opening cord.

Model-Building Contests

"Home Gadgets" Model-Building Contest

In the March "*M.M.*" we made the first announcement of a novel competition in which prizes are offered for Meccano "gadgets" of any kind that can be put to practical use in the home. Wool-winders, tool racks, match box holders and bicycle carriers are typical examples of the kind of models that will be suitable as entries and many others will readily suggest themselves to readers.



The mechanism of the Meccano "Magic Clock" illustrated on this page.

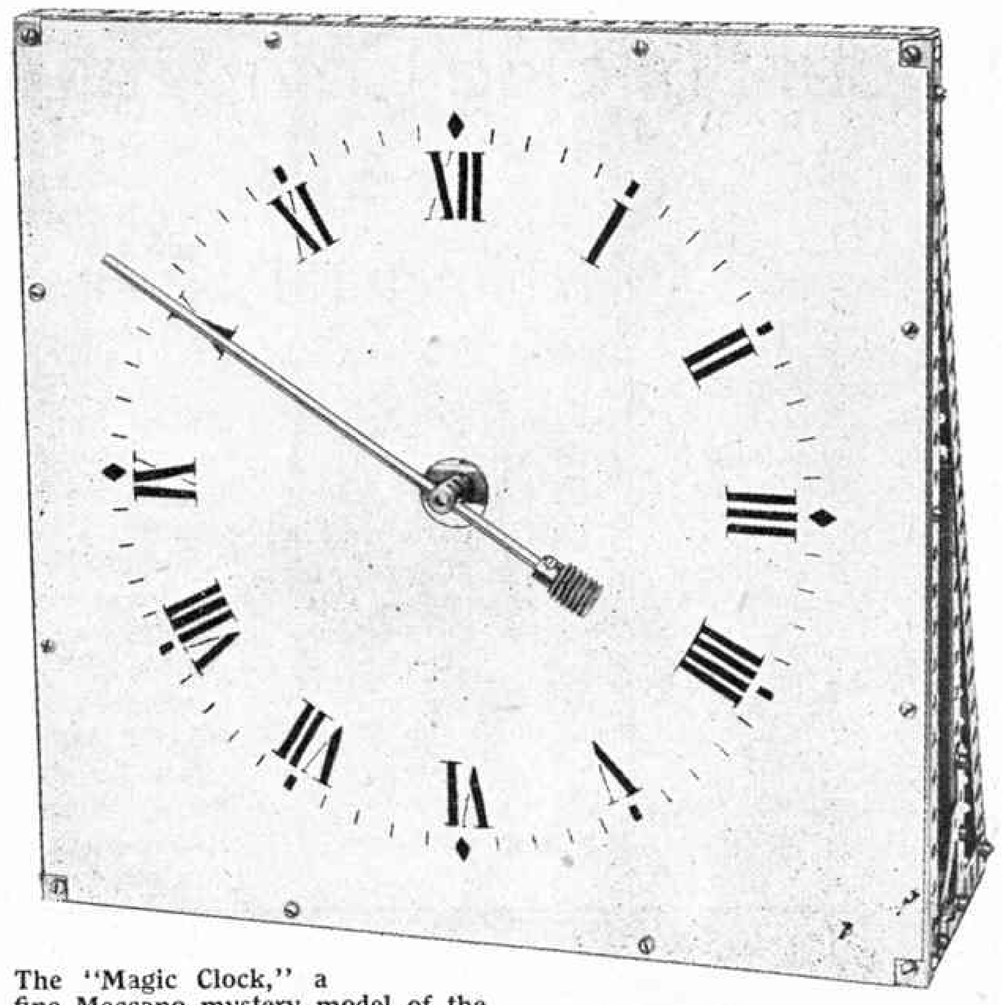
Only home gadgets such as those mentioned are eligible for this competition, and in building them readers may use any size of Meccano Outfit or any number of parts. The Contest is open to readers of all ages, and the prizes will be awarded to the senders of the gadgets considered by the judges to be the neatest and most practical.

When the model is completed it is only necessary to send either a photograph or a drawing of it to this office. The envelope should be addressed "*Home Gadgets Model-Building Competition,*" Meccano Ltd., Binns Road, Liverpool 13, and should be posted to reach Liverpool on or before 31st May.

The following prizes will be awarded for the best models submitted. First, Cheque for £3/3/–. Second, Meccano or Hornby products value £2/2/–. Third, products value £1/1/–. There will be also five prizes of products value 10/6 and five of products value 5/–.

"Meccano Puzzles and Mystery Models" Competition

From time to time we have illustrated in the "*M.M.*" mystery models and puzzles built up from Meccano parts. An example of a model of this kind is the Magic Clock illustrated on this page. A peculiarity of this clock is that if the hand is spun it will stop automatically at any predetermined hour! The demonstrator asks someone to state the hour at which the hand is to stop. He then moves the hand to the hour stated and sets it spinning rapidly. No matter how many revolutions the hand makes it will always stop at the prearranged point. The mechanism of this clock is extremely simple and is shown in the illustration on the left of the page. A Compression Spring normally holds a Contrate Wheel in engagement with a Pinion fixed on a weighted rod. The operator draws the clock hand outward, thus disengaging the Pinion and Contrate, and then sets it at the specified time. He then pushes the hand inward thus re-engaging the clutch and starts the hand spinning.

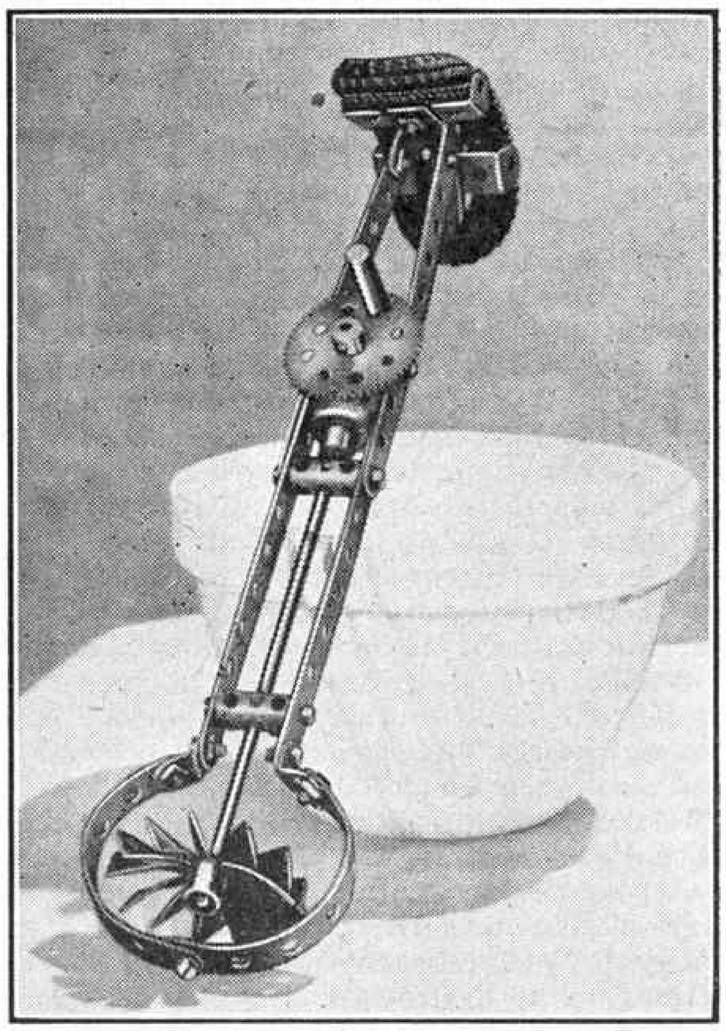


The "Magic Clock," a fine Meccano mystery model of the kind suitable for entry in one of the competitions announced on this page.

Many other models of this kind can be built up from a few Meccano parts and the planning of such puzzles forms a fascinating pastime. To encourage experiment in this direction we are offering prizes for the most ingenious and mystifying devices of this kind submitted to us. There is no age limit for competitors, and no restrictions are set on the number and assortment of Meccano parts that they may use in building their models.

A First Prize consisting of Meccano or Hornby products to the value of £3/3/– will be awarded to the sender of the most ingenious mystery model or puzzle submitted, and there will be a Second Prize of products value £2/2/– and a Third Prize of products value £1/1/– for the next best models in order of merit. In addition there will be five prizes of products value 10/6 and five consolation awards of products value 5/–.

Competitors should send in clear photographs or drawings of their models together with a description of its construction and method of working. Actual models must not be sent. Entries should be addressed "*Puzzles and Mystery Models Competition,*" Meccano Ltd., Binns Road, Liverpool 13, and should be posted in time to reach Liverpool on or before 29th June. A selection of the most ingenious prize-winning models will be illustrated and described in the Magazine when the results of the competition are announced.



This egg whisk built by G. Overton, Hull, from Meccano parts is an example of the type of model that will win a prize in the "Home Gadgets" Competition.

Model-Building Competition Results

By "Spanner"

"Architectural" Contest

The complete list of prize-winners in the *"Architectural"* Model-Building Competition, details of which appeared in the December issue of the *"M.M.,"* is as follows:

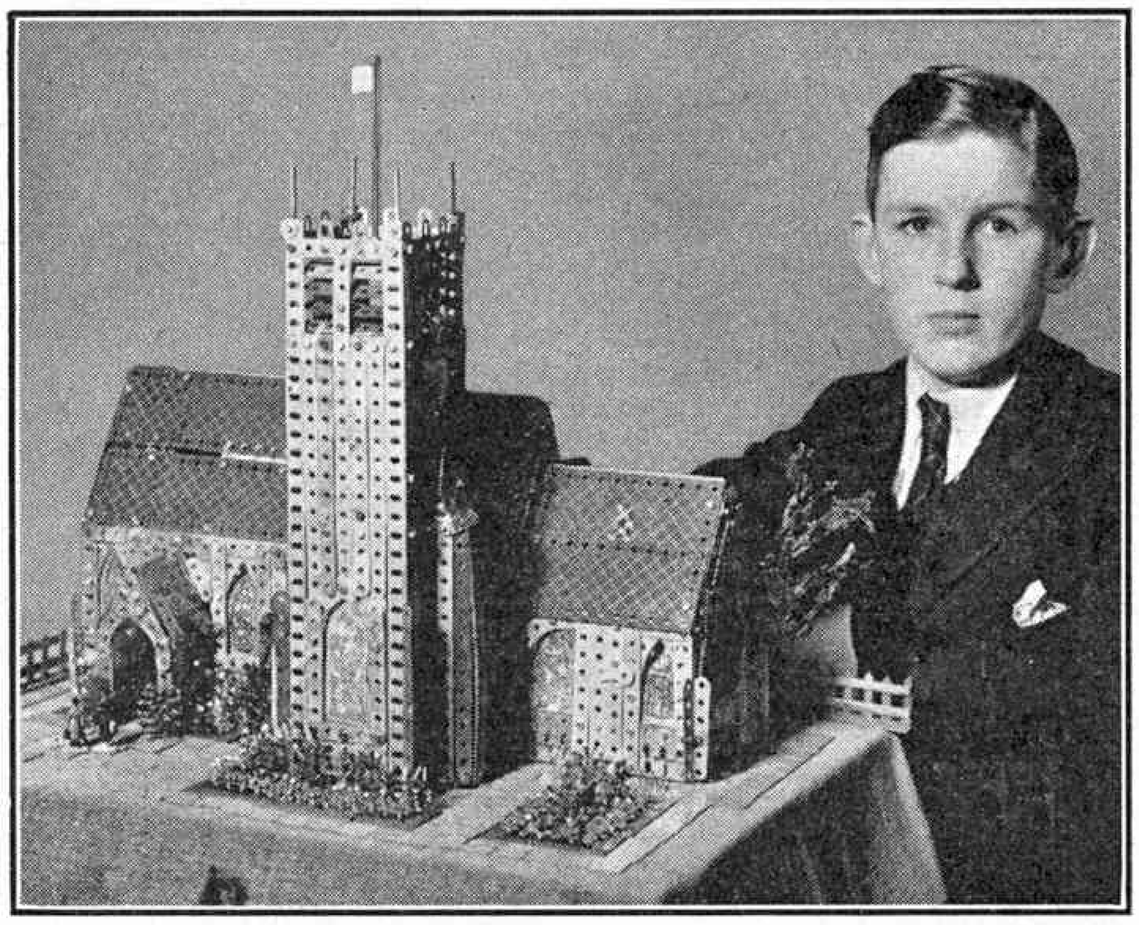
1st Prize, Meccano or Hornby products value £3/3/–: J. Darby, Holmfirth. 2nd, products value £2/2/–: J. Giese, Buenos Aires. 3rd, products value £1/1/–: E. D. Clements, Orpington.

Products value 10/6: R. Middleton, Hull; R. Allen, Burnbank; T. Wade, Johannesburg; K. Wood, Dorking; P. R. Wickham, Leicester; W. Halsall, Burscough.

This competition provided ample evidence of the utility of Meccano parts and their suitability for the construction of model houses, castles, monuments and other architectural subjects. Three of the principal prize-winning entries are shown on this page, and these are typical of the splendid work and neat construction that distinguished the majority of the models submitted. In reproducing architectural subjects it is most important to maintain the proportions of the prototype, and the prize-winners owe their success mainly to the fact that their models were the most realistic in this respect. Another feature that is essential to success in models of this kind is neat construction. A model that combines these two important characteristics rarely fails to attract favourable attention from the competition judges.

Now for a word or two about the prize-winning models. The chief prize was awarded for a fine model of a church built by J. Darby, Holmfirth. It is illustrated on this page, together with a portrait of its builder, and it incorporates all the external details of the actual building on which it is based, including five doors and 17 windows. The latter are "paned" with semi-transparent paper painted to represent stained-glass. The interior of the model can be illuminated by Meccano pea lamps, and when these are in use the result is very impressive. The model is about two feet high and has a base measurement of 2 ft. by 1 ft. 6 in. wide.

Darby is only 14 years of age, a fact that was taken into consideration in weighing up the merits of his work, and he has every reason to feel proud of his success in winning First Prize in this Competition. I congratulate him on his achievement, and I hope he will continue to take part in future Contests.

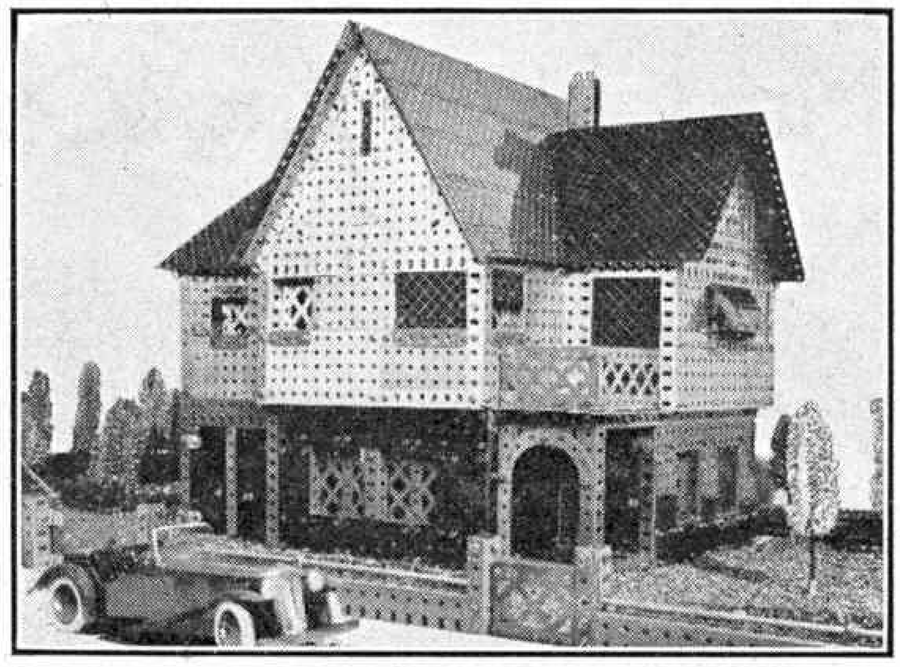


First Prize in the "Architectural" Model-Building Competition was awarded for the model church shown here together with its builder, J. Darby, Holmfirth.

Another attractive model among the chief prize-winners was a fine villa built by Julio Giese, Buenos Aires, who was awarded Second Prize. This model is shown in the illustration at the top of this page and a study of its details will reveal many interesting and novel constructional features. The doors are mounted on Hinges, and the windows are equipped with sun blinds represented by Flexible Plates. There is also a garage with hinged double doors, which houses a Meccano Motor Car.

The walls are built mainly from Flat Plates, Angle Girders and Strips, while the roof is formed from Strip Plates and Braced Girders are used for the windows. Chimney pots are neatly represented by the barrel portions of Spring Buffers, which are mounted on a smoke stack built up from Flat Girders and Angle Girders.

Many competitors chose monuments and towers of various kinds as the subjects for their models, and one of the most successful of these was E. D. Clements, Orpington, who built a giant model of a fine clock tower at Barnstaple. The model is nearly 9½ ft. in height and 1 ft. 8 in. square at its base, and is one of the most neatly built I have had the pleasure of examining.



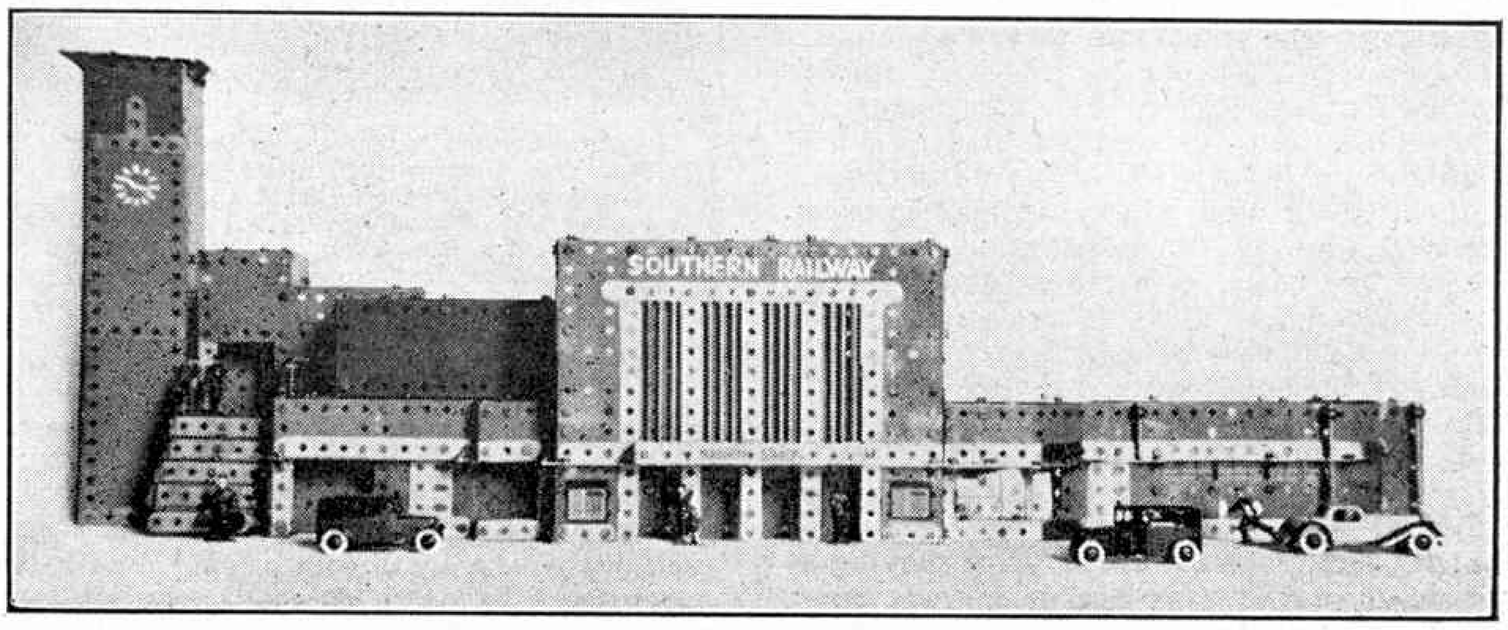
The features and proportions of a modern Argentine villa are excellently reproduced in this fine model by J. Giese, Buenos Aires, who was awarded Second Prize.

The illustration at the foot of this page shows a model of Surbiton Station on the Southern Railway, which won a prize for P. R. Wickham, Leicester. The model is built to a scale of ¼ in. to 1 ft., and Wickham used as his guide in constructing it the photograph of Surbiton Station that appears on page 55 of the current issue of the *"Hornby Book of Trains."*

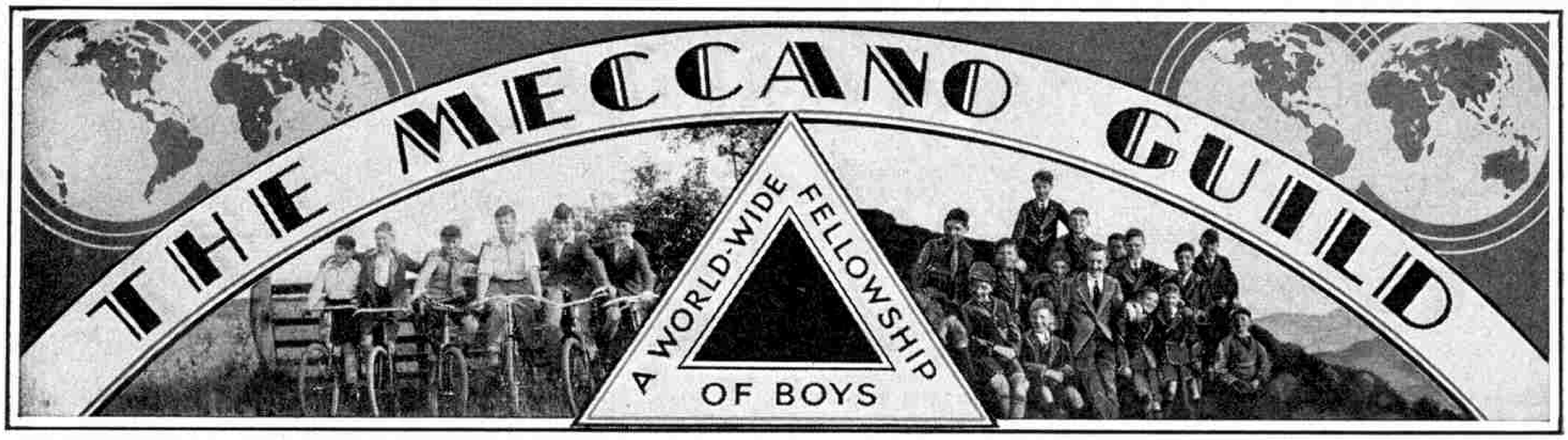
The model is 3 ft. long, and the tower is about 1 ft. high. The walls and roof are built mainly from Flexible and Strip Plates arranged with their plain faces outward, and the rather austere appearance of the building is relieved by a little decorative work over the entrance, reproduced by means of Axle Rods clamped between pairs of Strips and backed with Strip Plates.

In striking contrast to the three models already mentioned was one of an ancient Egyptian temple, which was built by a South African competitor, T. Wade, Johannesburg. Two large pylons at each side of the main entrance of the temple give it a most impressive appearance. They are built up from Flanged Plates and Strips, Flat Brackets being called into use for decorative purposes.

A fine model of a market town clock tower fitted with clockwork mechanism, won for W. Halsall, Burscough, a prize of 10/6. The model stands 10 ft. high, and is equipped with the same mechanism as is used in the Meccano Grandfather Clock.



The facade of the S.R. station at Surbiton, reproduced in Meccano by P. R. Wickham, Leicester.



The Outdoor Programme

Now that we have emerged from the blackout, and evenings are lighter, there has been a very gratifying revival in club activity. A glance at the reports appearing on the opposite page is sufficient to show this. Clubs whose activities were restricted to Saturday afternoons are holding regular evening meetings, and club rooms that for various reasons had to be closed entirely during the darker months have now been re-opened. Nowhere did club life come to a complete stop, for Leaders kept in touch with their members where meetings could not be held, and the result is seen in the ease with which the usual activities have been recommenced. Model-Building competitions have been resumed, and Hornby Railways, both in clubs and Branches, have been extended or re-planned to allow operations of a topical character to be carried out on them.

Every club should make the very best of the opportunities now given them of enjoying to the full the delights of club life, and they must not overlook the usual outdoor activities of the Spring and Summer seasons. Cycle runs, rambles and visits of all kinds must be arranged, and preparations should be made now. The photographic sections also should be set to work. As long as members of these take care not to photograph scenes of military importance they can carry on much as usual. The article on page 200 of this issue will be a useful guide in this respect, and every club Leader should study it carefully.

Photographs for the "M.M." Guild Pages

I should like to draw the attention of Leaders once more to the need for portraits of officials, including themselves, and club group photographs for publication in these pages. Nothing pleases members more than the appearance in the *"M.M."* of photographs of this kind from their own clubs. The trouble of obtaining them is amply repaid by the feeling of pride that members gain when they see their club given such valuable publicity in the organ of the Guild.

Leaders of new clubs are particularly invited to send me photographs, but I should like to see also recent photographs from older clubs. In most cases such clubs will have gained new members, but I shall welcome new photographs in any case, and the reproduction of one of these in the *"M.M."* will help to show that a well-known club continues to flourish and to provide a rallying point for Meccano enthusiasts. Photographs showing members in outdoor scenes on excursions are particularly useful, and I should like Leaders of photographic sections to keep this in mind.

Funds for Outings

The question of providing funds for outings will be perhaps a little more urgent than in previous years. It may be settled by the same methods as those I have always recommended, however. Undoubtedly the most satisfactory plan is to open a miniature savings bank, under the supervision of the Leader. Into this each member pays a small sum weekly, and it is surprising how soon regular contributions mount up into a sum that is sufficient to allow very enjoyable club excursions to be made.

Meccano Club Secretaries

No. 53. A. Caruana



Andrew Caruana is secretary of the Lasallian M.C. This enterprising club was founded last year in the Stella Maris College, Gzira, Malta, by the Rev. Bro. Anthony, F.S.C., Leader. The Very Rev. Bro. Augustine, F.S.C., Rector of the College, is President. Model-Building and fretwork are the chief activities. A very successful exhibition of models held recently attracted about 750 visitors, who expressed their high appreciation of the display.

Enterprise in South Africa

From South Africa comes heartening news of a splendid Exhibition arranged by the Malvern (Johannesburg) M.C. This club has always been noteworthy for its enterprise, and in the past few years its efforts have resulted in a gain to charities of more than £700. An admirable feature of the club is the manner in which members give personal service. They are particularly interested in the Epworth Boys' Home at Pretoria, which was recently visited by a party taking small gifts that should have been presented at a Christmas party that had to be postponed. In his letter telling me about this visit the Leader said that "It did one's heart good to see with what joy the small gifts were received."

The club's most recent Exhibition took the form of a Fair opened by Mr. J. J. Page, Mayor of Johannesburg. Mr. Page said that the Malvern club set a fine example to the youth of the city and expressed the wish that many similar clubs would spring up in the area. A splendid display of models was attractively displayed in a decorative setting designed and made by members themselves. About £75 was realised, thanks to the liberal support given by the people of Malvern to the efforts of the club, which is highly appreciated in the district.

Proposed Clubs

Attempts are being made to establish Meccano clubs in the following places, and boys interested should communicate with the promoters, whose names and addresses are given below.

BANKS—W. H. Howard, 3, Todds Lane, Banks, Nr. Southport.
BEVERLEY—G. R. Lowther, "Elm Villa," Long Lane, Beverley, E. Yorks.
BIRMINGHAM—J. Perrins, 12, Conington Grove, Harborne 17.
BRACKLEY—V. Knibbs, 39, Mixbury, Nr. Brackley, Northants.
CLIFTON—B. Gadd, Bridge Farm, Clifton, Notts.
DODWORTH—N. Charlesworth, 22, Pilly Hill, Dodworth, Nr. Barnsley.
LLANWRYD WELLS—W. D. Evans, "Bronderi," Llanwryd Wells, Breconshire.
MALTA—Mr. J. M. Demanuele, The Lyceum, Victoria, Gozo, Malta.
MELYN NEATH—N. Hollway, 50, Evans Road, Melyn Neath, Glam.
SHEFFIELD—T. K. Jones, 327, Millhouses Lane, Ecclesall, Sheffield 11.
SLOUGH—I. Campbell, 133, Shaggy Calf Lane, Slough, Bucks.
STANWELL—R. Armitage, 11, Bedfont Court Estate, Spout, Stanwell.
STOURPORT-ON-SEVERN—B. Turner, 28, Bewdley Road North, Worcs.
SUNBURY-ON-THAMES—A. Gifford, 23, Vicarage Road, Sunbury-on-Thames.



St. Oswalds M.C.—Model-Building and other operations have been continued. Special interest was taken in a series of model aeroplanes built by members and brought for display at one meeting, when marks were awarded for the models. Games played include billiards and Lexicon. Two members entertained the club with conjuring tricks, and at one meeting extracts were read from issues of the *"M.M."* A talk on *"The Underground Railway"* has been given. Club roll: 20. *Secretary:* J. F. Jaques, El Molino, 5, Ingram Road, Thornton Heath, Surrey.

Pettit's Senior Boys' School (Romford) M.C.—Meetings have now been recommenced. A new secretary has been appointed, as the member formerly holding this position has joined the R.A.F. A recruiting campaign has been carried out, to replace members evacuated, and 14 recruits have been obtained. Meetings are now to be held regularly. Club roll: 8. *Secretary:* K. Powell, Pettit's Senior Boys' School, Romford.

Islandmagee M.C.—The club continues to make good progress, and admirable reports of its proceedings are given regularly in the press. A heated Debate was held on the question *"Is Meccano or the Hornby Railway the best Hobby?"* This ended in a division of honours. The club's second birthday was celebrated at a special meeting, which included tea and a short entertainment by members, ending with operations on the Hornby-Dublo layout. Railway operations at present are very intensive, and thoroughly enjoyed. Games Evenings also have been held. Club roll: 14. *Secretary:* S. McCready, "Hillmount," Islandmagee, Co. Antrim.

Whitgift School (Croydon) M.C.—It has been necessary to suspend activities for a time, but officials and members are determined to recommence as soon as this may be done safely, and a resumption of a prosperous career is anticipated. Many former members are now in the Forces, or engaged in A.R.P. work. Club roll: 29. *Secretary:* G. G. Caddy, 14, Culmington Road, South Croydon, Surrey.

Hornsea Evacuee M.C.—Several meetings of this new club have now been held. At one of these Mr. R. W. Shooter, Leader, gave a lecture on *"Norway."* Other meetings were devoted to model-building, and a very enjoyable evening was spent on one occasion with a Hornby Railway. The club programme is being planned on similar lines to that of the Hornsea M.C., and the new organisation promises to be very successful. Club roll: 6. *Secretary:* F. Gladstone, 3, Alexandra Road, Hornsea.

Tynecastle School M.C.—Evacuation caused the suspension of activities, but meetings are now again being held in a temporary club room. Members are full of enthusiasm, and a good programme is being arranged for the rest of the Session. Club roll: 12. *Leader:* Wm. C. Stephen, 1, Roseburn Gardens, Edinburgh.



A group photograph of members of the Malvern (Johannesburg) M.C., with Mr. E. W. Sykes, Leader, third from the left, and Mr. D. Hean, secretary, third from the right, both in the back row. This South African club was affiliated in December 1921, and has a splendid record. The latest achievement was a great fair, opened by the Mayor, from which £75 was realised. During the past few years the club has raised over £700 for local charities.

Islington M.C.—Membership is increasing and there is more activity. Most of the meetings are devoted to work on the layout. The low-level track has been completed, and a high-level track is now being constructed. Regular meetings are held on Saturday afternoons, but several members meet during the week to carry on with track laying. The Meccano Section is showing good progress, and all members are making special efforts to increase the interest of club work and attract more members. Club roll: 12. *Leader:* Mr. V. Miller, 25, Bewdley Street, London N.1.

Folkestone M.C.—Now that evenings are lighter meetings are being held on Wednesdays. Monthly Model-Building Contests are being arranged. The Fretwork Section also continues to be active, constructing accessories for the club's model railway. A satisfactory sign of progress is a steady increase in club funds. Club roll: 8. *Secretary:* W. F. Cotter, 68, Linden Crescent, Folkestone.

Acton M.C.—A special meeting has been devoted to solving the competitions announced in the *"M.M."* A discussion has been held on the position of the club in wartime. General activity has been continued. Model-building meetings are held on Saturday afternoons, and these are supplemented by Competition Evenings. A cable railway and a large railway coach have been constructed. Several meetings have been devoted to track operations, and a Debate on *"Diesel v. Electric Power for Trains"* was keenly contested, ending in a vote in favour of electric power. A discussion has been held on *"Permanent Way Gauges."* A Lecture has been given on *"Modern Motor Car Traction,"* and a Cinema Show was greatly enjoyed by members. Club roll: 15. *Secretary:* S. W. Simmons, 7, Alfred Road, Acton, London W.3.

Plymouth M.C.—Further details are now available of the club's splendid effort on behalf of the *"M.M."* Radio Fund for the R.A.F. The demand for tickets for the Concert was so great that an extra supply had to be printed. The whole of the programme was given by the Leader and members, and the sum raised was £2/2/–, although the weather on the day of the concert was very unfavourable. The Meccano Section has completed splendid models of a horizontal steam engine, and an articulated lorry. Club roll: 120. *Secretary:* A. E. Miller, 21, Hamilton Gardens, Mutley, Plymouth.

MALTA

The Lasallian M.C.—The club's exhibition was an outstanding success. The number of visitors was about 750, and all expressed their appreciation of the splendid display. Rev. Brother Augustine, F.S.C., Rector of Stella Maris College and President of the club, opened the Exhibition. The models on view included a dockyard and an aerodrome, with miniatures in Meccano of Britain's fighting forces. Fretwork models also were shown, and a special room was devoted to Meccano Guild and club literature. The Exhibition was followed a few days later by a party and a football match between "Spanners" and "Screwdrivers," the two sections of the club. The result of the match was a draw. Club roll: 28. *Secretary:* A. Caruana, Floria H, Victory Street, Gzira, Malta.



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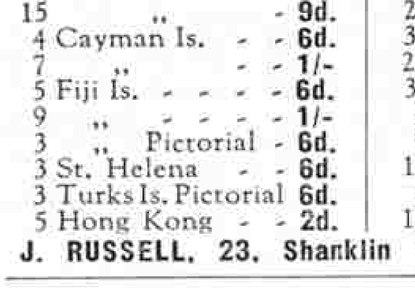
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STAMP COLLECTING

A RED CROSS COLLECTION

EARLY last month it was announced in Parliament that consideration is being given to the joint issue of a postage stamp by France and Great Britain. Such an issue would be the first instance of two great Powers combining for such a purpose, and there is a great probability that the contemplated issue may carry a premium for the benefit of Red Cross funds.



The proposed stamp would be the first charity issue ever made in Great Britain. Many Red Cross charity stamps have been issued in other countries, recent examples being those commemorating the 75th anniversary of the founding of the International Red Cross at Geneva in 1864. These stamps offer an excellent subject for a specialised "Wartime" collection. Few are costly to buy, and all of them are steadily growing in value.

The prime mover in the foundation of the International Red Cross was Henri Dunant, a Swiss banker, who was present at the battle of Solferino in 1859 when Austrian troops were fighting French and Italian troops commanded by the Emperor Napoleon III. Dunant was so appalled by the wretched conditions of the wounded and their unnecessary suffering, that he devoted the rest of his life to the establishment and extension of the Red Cross movement. He was instrumental in calling together the international conference at Geneva in 1863 that led to the Treaty of Geneva of 1864, the first of a long series of treaties that have for their object the removal of the most horrible features of War.



Dunant died in 1913. He had seen the germ of a movement to outlaw War in the Red Cross and in the World-wide adoption of its principles, and he had worked unceasingly toward that goal. There are now 64 countries and states with National Red Cross Organisations.

An excellent portrait of Henri Dunant appeared on the 10c. value of Belgium's issue of April last commemorating the 75th anniversary of the Geneva Treaty. Another portrait appeared on the 30c. value of Switzerland's Pro Juventute issue of 1928. A representation of the field at Solferino appeared on the 3½ mk. value of Finland's issue of 1939 commemorating the Geneva Conference.

The Belgian and Finnish stamps are illustrated on this page. It will be noticed that both incorporate in their designs the Geneva Cross, red on a white ground, the symbol of the International Red Cross that is the common feature of all Red Cross charity stamps.

There is not space here to do more than outline the functions of the Red Cross in wartime. Briefly stated, its work is to relieve suffering among the sick and wounded, to secure reverent treatment of those killed in action, and to protect the interests and ease the lot of prisoners of War, civilians as well as combatants.

During the last war the British Red Cross Society and the Order of St. John of Jerusalem, working as a joint Committee, just as they are doing in the present war, spent over £17,000,000 among the sick and wounded and the prisoners of war. Before the work of that war was fully cleared up in 1920 the total had reached £20 million, every penny of which was subscribed voluntarily.

Already over £500,000 have been spent in the present war, although no serious fighting has taken place on land. Parcels of food and clothing have been sent each week to every prisoner in the enemy's hands, and for this work the Swiss and American Societies are acting as intermediaries between Britain, France and Germany.



Even before Dunant conceived his idea of an international organisation, Britain had recognised the necessity for some system of aid auxiliary to the primitive nursing services provided by an army in the field. Russell, *"The Times"* War correspondent in the Crimea in 1854, drew attention to the appalling conditions in the military hospitals there, and as a result the Government invited Miss Florence Nightingale to organise a voluntary nursing aid detachment for active service in the Crimea.

Every British boy knows the story of Florence Nightingale, "The Lady of the Lamp," and will wish to include her portrait in his Red Cross stamp collection. It appears on the 30c. value of the Belgian 1939 series and is illustrated on this page.

In addition to Belgium and Finland, five other countries, Denmark, France, Japan, Siam and Switzerland, issued stamps to mark the 75th anniversary of the foundation of Red Cross work. From the issues of



those countries we have chosen the Danish designs for illustration, and reproductions appear on page 199. The Danish issue, in which there are two stamps, show the Queen of Denmark in the uniform of a Red Cross nurse.

Finland has issued a Red Cross charity series regularly each year since 1933. We have chosen for illustration four stamps of the 1940 series issued in January. They pay tribute to the great spirit of the Finnish soldier by depicting Finnish fighting men in uniforms of bygone years.

The only British Empire Red Cross stamps available for our collection are those issued during the last war in the Bahamas, North Borneo (two issues), the Straits Settlements, Trengganu, and Trinidad, which also produced two issues, one in 1915 and another in 1916. The bahamas issue is illustrated on page 199.

France has ever been a staunch supporter of the Red Cross, and that country paid a high tribute to its importance in the Great War of 1914–18 by issuing a special stamp in aid of its funds, in the first month of hostilities. This was followed in October 1914, three months later by another special issue, and a third appeared in 1918.

Belgium made three issues during the Great War, in October 1914, January 1915, and during 1918. We have illustrated the first of these, issued in Antwerp a week before the Germans occupied that city, and our remaining Red Cross stamp illustration, on page 199, is from Greece's issue of 1924.

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Scarce stamps from BRUNEI, Perak, Andorre, FALKLANDS, Greece, Manchukuo Pict., MEMEL, Anzac Commem., Belgium High Value (7 francs), S. Rhodesia, JHIND STATE, Estonia, and 5 rare POLAND. Free to collectors who ask to see our bargain approval sheets. Send 1½d. postage (abroad 9d.)

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This month I am presenting three fine covers usually sold at 1/6 **FREE** to approval applicants. The covers are

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FREE! 150 mounts and 25 good stamps with bargain approvals. Enclose postage. E. & A. Hand, Craddocks Parade, Ashtead.

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1/- WORTH STAMPS FREE

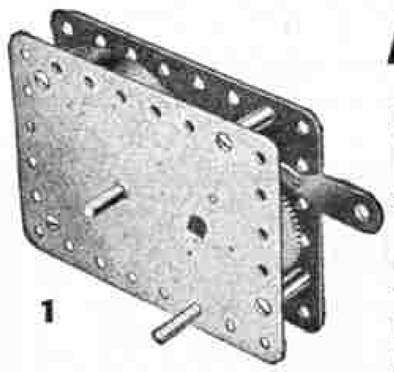
Pick what you want to this amount from my approvals. Send P.C. to: **L. WILSON, LACHE LANE, CHESTER.**

100 COLONIAL STAMPS FREE. British include George VI sets—to approval applicants sending postage. Arthur M. Bowman, 34, Meriden Avenue, Stourbridge.

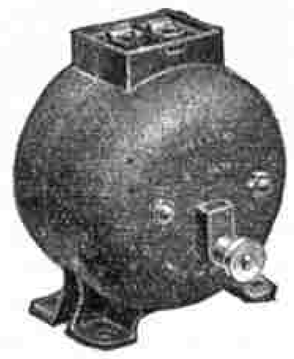
FREE! Genuine Portrait Stamp of **HITLER**—commemorating his 48th birthday. Send 2d. ptge. and request approvals. W. O. Took, 10, The Hornet, Chichester.

This Space is set to ½ inch s.c. and costs 8/- per month. The sum is the 50th of £20, the price of a whole page advertisement. Over 200,000 boys and parents read the "*Meccano Magazine*" each month. You can therefore reach this exclusive public for less than a half-penny a thousand.

MECCANO MOTORS FOR DRIVING MECCANO MODELS



1



2

If you want to obtain the fullest enjoyment from the Meccano hobby you should operate your models by means of one of the special Meccano Motors. A selection is listed below.

1. No. 1 Clockwork Motor.
This strongly built and efficient Motor is fitted with a powerful spring that gives a long and steady run, and is exceptionally smooth in action. The Motor is of the non-reversing type. Price **5/3**

2. EO6 Electric Motor (6-volt).
An all-enclosed non-reversing Motor suitable for driving models built from Outfits up to No. 5, and also some of the lighter models built from Outfits No. 6 to No. 8. Price **6/9**

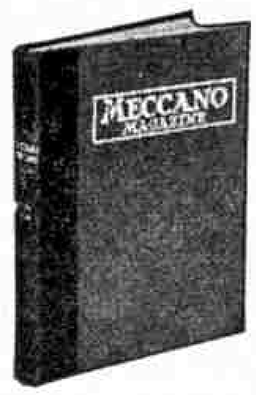
EO20 Electric Motor (20-volt).
The EO20 is a powerful non-reversing Motor of similar construction to the EO6 Motor ... ... Price **6/9**

E1 Electric Motor (6-volt).
This highly efficient Motor (non-reversing) will give excellent service. Price **9/-**

E120 Electric Motor (20-volt).
The E120 Electric Motor is a very reliable and smooth-running power unit. (Non-reversing.) Price **9/-**

MECCANO LTD. LIVERPOOL 13

BINDING THE "M.M."



Binding cases for back numbers of the Magazine may be obtained from Messrs. O. H. Bateman and Co., 23, Hanover Street, Liverpool. These are supplied in two sizes (1) for six copies price 3/3 and (2) for twelve copies price 4/9, post free in each case. The binding cases are supplied in what is known as "Quarter Basil, full cloth"—that is to say three-quarters of the sides are dark crimson cloth and the back and a quarter of the sides are dark crimson leather as shown here. The case is tastefully embossed in gold with the name "Meccano Magazine," and on the back is the name and volume number.

Binding 6 and 12 copies. These binding cases are supplied so that readers may have their Magazines bound locally, but where desired, the firm mentioned above will bind Meccano Magazines at a charge of 5/9 for six issues or 7/6 for twelve issues, including the cost of the binding and also return carriage. The covers of the Magazines may be included or omitted as required, but in the absence of any instructions to the contrary they will be included.

Whilst the binding of the twelve Magazines is quite satisfactory, they form a rather bulky volume and for that reason arrangements have been made to bind six months' Magazines where so desired, as explained above. Back numbers for any volume can be bound and the case will be embossed with the volume number.

New Collectors' Corner

Each month in future we propose to devote this little corner of our stamp pages to articles of practical help to new collectors. They will be designed to give real help in solving stamp collecting problems that often puzzle boys who have just taken up the hobby, and we hope that readers who have encountered difficulties will write to us about them so that we may use their experience to guide other collectors. By getting together in this way we can all help one another to get the greatest possible amount of interest and enjoyment from stamps right from the commencement.



Overprints and Surcharges

A few days ago we encountered a young collector who was greatly puzzled by reference to "overprints" and to "surcharges," and he wanted to know just what was the difference. The simple way to distinguish between the two is to remember that an overprint alters the purpose of a stamp issue, while a surcharge alters its value. An interesting example occurs in the Bahamas Red Cross stamp illustrated on this page. This is a 1d. stamp first issued in 1910, overprinted with a Red Cross and the date "1.1.17."

Overprinted and surcharged issues are usually temporary productions that have a very short life, either because the authorities do not wish to make a specially designed issue for the purpose in mind, or because there has arisen a shortage of a particular stamp that can be met only by temporarily pressing into service some other stamp overprinted or surcharged, or both, to indicate its new purpose.

Provisionals

Such stamps are known as "provisionals," and good recent examples have come from Newfoundland, where a temporary shortage of 2c. and 4c. stamps arose because the delivery of new printings was delayed at the outbreak of the War. The shortage was overcome by issuing the remaining stock of the 5c. stamps issued to celebrate the Royal Visit to the Dominion in June last, surcharged with the values "Two Cents" and "Four Cents."



Cancelled to Order

New collectors frequently are puzzled by the fact that they are offered stamps bearing postmarks suggesting that they have been used on letters, but still possessing obviously unused gum on their backs. Such stamps are usually of the class known as "cancelled to order." They are remainders from obsolete issues postmarked by the authorities before being sold to wholesale dealers. Obviously their value is much less than that of genuinely used specimens, and therefore only the less reputable countries allow their stocks to be sold in this way. In other countries all unsold stocks are destroyed immediately an issue is withdrawn, but in some cases a small supply is retained for sale to collectors.

Stamp Gossip

and Notes on New Issues

New Zealand Centennial Issue

Alterations in postage rates brought about by the War have compelled the New Zealand Government to make one important alteration in the Centennial Commemorative set now on sale in the Dominion. The 7d. value, which was described in the stamp collecting pages of the October *"M.M."* shows a sitting of a Maori Council. It has now been withdrawn and replaced by an 8d. value bearing the same design in the same colourings.

The postage rate changes are such that a 7d. value is unlikely to be required, while there will arise a big demand for an 8d. stamp.



An Attractive Stamp Bulletin

Harry Burgess and Co., of Pembury, Kent, have sent us a copy of the first issue of their new style quarterly bulletin, one of the most attractive dealers' magazines we have encountered. It contains several pages of brightly written notes on current stamp topics, in addition to attractive offers that contain something for everybody.

At the price of 6d. per annum it will repay reading by any stamp collector. Messrs. Burgess will send a specimen copy to any *"M.M."* reader in return for a 1½d. stamp.

Albanian Costume Stamps

Readers who are compiling a collection of stamps showing national costumes will welcome the new Albanian stamps illustrated on this page. They are two of four such stamps issued.

The 1q. shows a trousered Gheg, or Northern Albanian, and the 2q. shows a Tosk, from the Southern districts, wearing the pleated skirt known as the fustinella. The other values show female costumes. The 50q. depicts a girl in the long Turk style trousers that are commonly worn in Scutari, Northern Albania. The 3q. design shows an ornately clad Gheg girl.

French Charity Stamps

Two War Charity stamps have been issued in France in aid of Soldiers' Comforts Funds. Each stamp shows an infantryman on guard at his post, one in the Maginot Line outposts and the other in the Colonial Empire.

It is understood that France will shortly issue a charity stamp bearing a portrait of Andre Maginot, creator of the Maginot Line, and others dedicated to the French Generals of the last War and to the French peasantry.

We thank Stanley Gibbons Ltd. for their courtesy in loaning the stamps from which the illustrations for our stamp pages have been made.

"Famous Americans" Series

The first of the series of "Famous Americans" commemorative stamps appeared in the U.S. early in February. Five stamps with portraits of famous writers and poets were issued. The portrait on the 1c. stamp is that of Washington Irving, 1783-1859, the first American writer to gain international fame. In his later years Irving was U.S. Ambassador to Spain. The 2c. stamp shows James Fenimore Cooper, 1789-1851, the author of *"The Last of the Mohicans," "The Pathfinder,"* and other famous books. Ralph W. Emerson, 1803-1882, is shown on the 3c. stamp, Louisa May Alcott, 1832-1888, author of *"Little Women,"* on the 5c. value, and Samuel L. Clemens, 1835-1910, best known as Mark Twain, on the 10c.

The second section of the series is to follow shortly with five portraits of famous workers in the social and education fields. These will show portraits of Horace Mann, Mark Hopkins, Charles W. Eliot, Frances E. Willard and Booker T. Washington on the 1c., 2c., 3c., 5c. and 10c. values respectively.

* * * *

The design of the new 10 sen Japanese stamp is one of the most delightful we have seen in recent years. It shows a plum tree in full bloom, the design being taken from the panelling of an ancient casket in the Museum of the Imperial House at Tokio.

* * * *

A report published by the Australian Postal Administration states that the total number of postal packets despatched in the Dominion in the official year 1937–38 was 889770,900. Parcels accounted for 9½ millions and newspapers for 162 millions. Registered packets totalled 8½ millions.,

A United States Map Stamp

A new map stamp has been issued in the United States to commemorate the 50th anniversary of the four States of Montana, Washington, North Dakota and South Dakota. The capitals of these States are named on the map, which shows the north west section of the United States, with the four States concerned in white. The value of the stamp is 3c., and its colour is magenta.



Photography During The War

Carry On With Your Camera

DURING the past few weeks, as daylight has shown signs of returning, I have had large numbers of letters from readers about photography during the war. There appears to be a very widespread impression that photography is now almost entirely forbidden, and that it is dangerous even to be seen carrying a camera. This impression is entirely mistaken.

During a war period it is obvious that photographic activities must be restricted, and the authorities have issued a list of restrictions which, at first sight, appears very formidable. Actually, if this list is examined carefully, it is seen to consist of little more than the prohibition of photographing anything connected with the Army, the Navy or the Air Force. This is what we should expect, and it really does not give us anything to worry about. In addition to military objects, we must not take photographs of docks or harbours, factories or suchlike places where munitions of any kind are being made, electricity, gas, or water works, or gasometers or reservoirs. Similarly we must not photograph hospitals or ambulances or convoys of injured persons. There is little more to remember.

Many people have the idea that to be seen carrying a camera would bring about a compulsory visit to the nearest police station, but this is certainly not the case. It is obvious that one must not carry a camera near places where photography is forbidden, whether we actually intend to take photographs or not; but elsewhere one can carry a camera over the shoulder with perfect freedom.

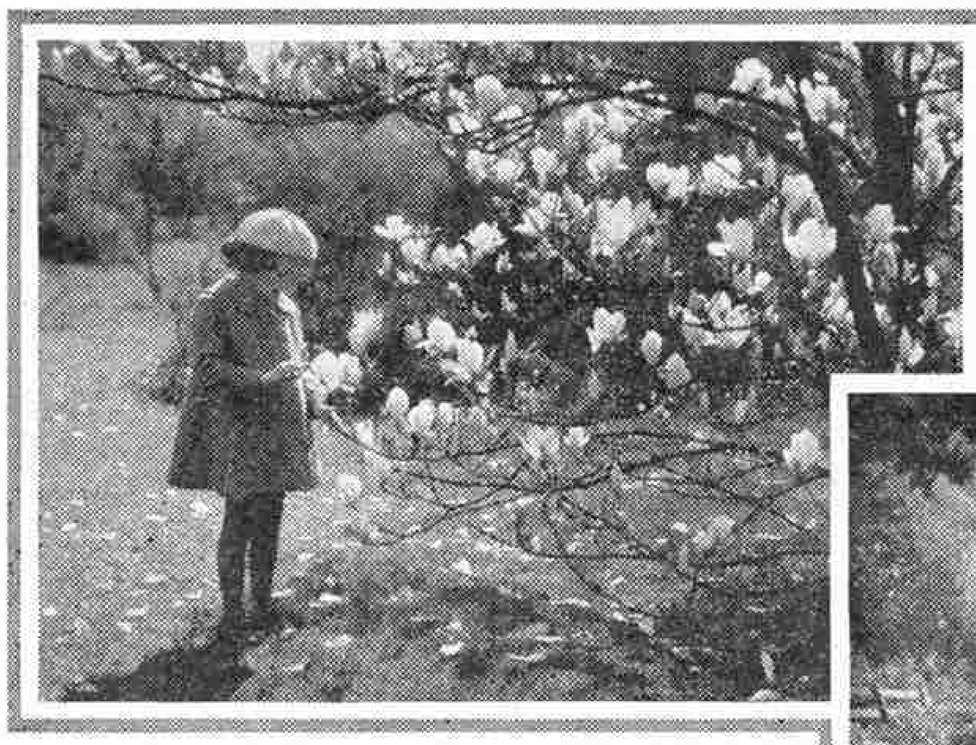
All this means that a very large proportion of our peacetime photography can be carried on just as usual. There are still the beautiful country, river and lake scenes waiting for us; and provided there is no camp in the neighbourhood we can wander as we will, snapping as we go. Family photography in the evenings or at the week-end has acquired a new interest as the result of the upheavals of war. Many of us find ourselves among new faces, and we are keen to take the opportunity of adding their photographs to our albums.

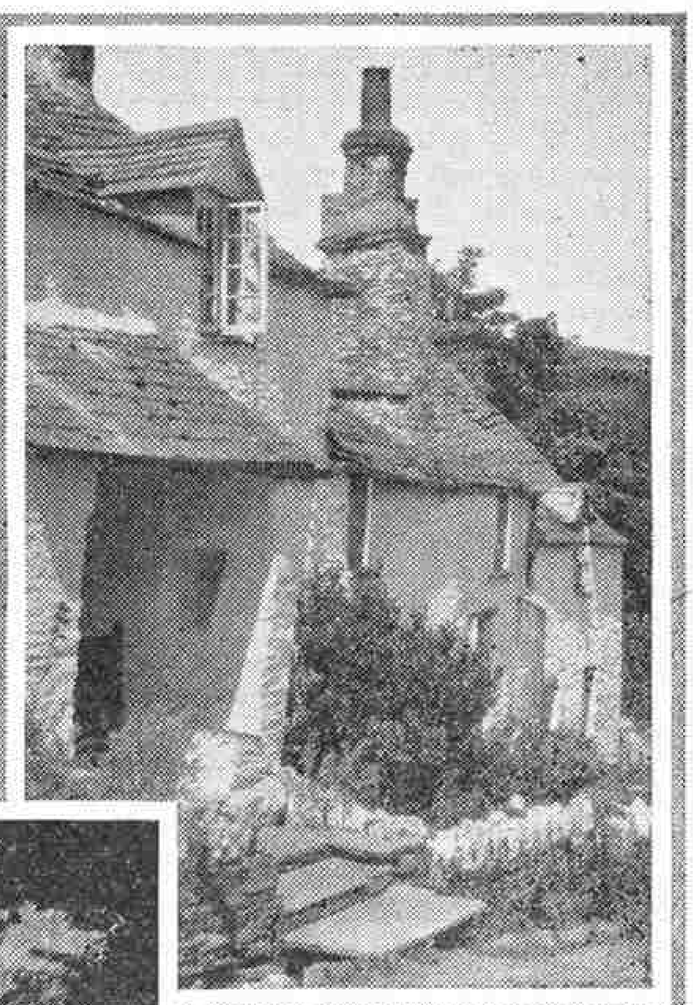
Then there are the splendid opportunities of making pictures of relatives and friends home on leave from their Service duties. Every opportunity should be taken of making such photographs, and we can do many good turns for friends and neighbours who are without cameras, by taking pictures of their Service visitors. Indeed, we hope all readers who possess cameras will take every opportunity of making such photographs for friends. A good turn done in this way is deeply appreciated.

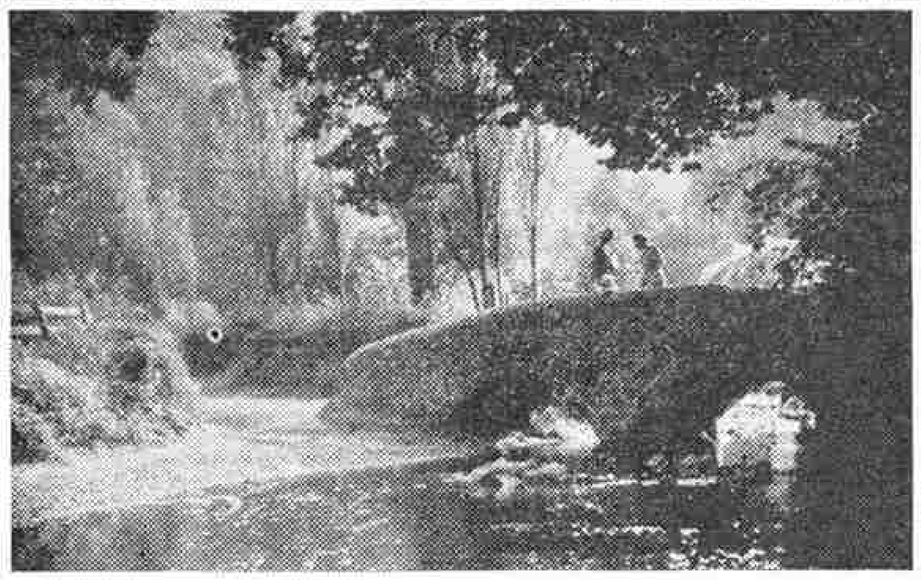
Perhaps the best way to sum up the photographic position will be to quote the following extract from an announcement made by the War Office on 7th October 1940:

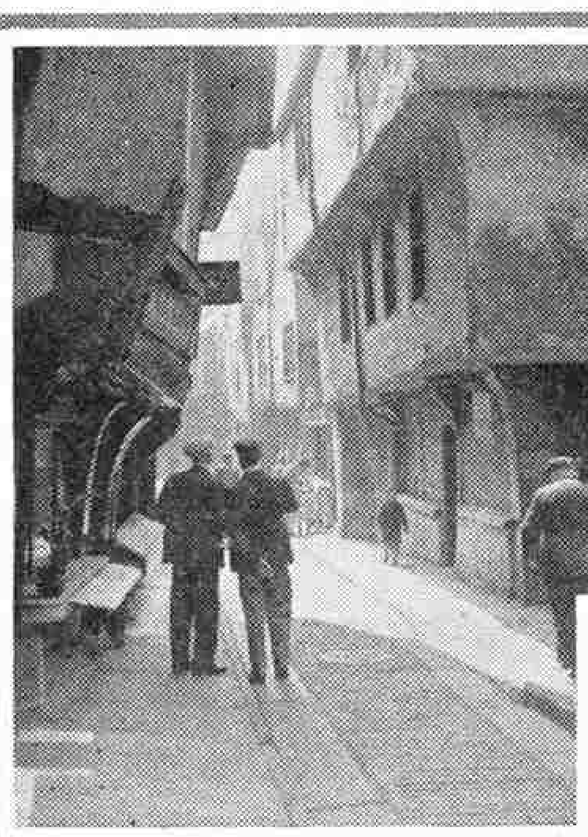
"Generally there is no ban upon the carriage of cameras in public places by persons other than enemy aliens, who would require a permit for this purpose. It is not forbidden to photograph views or objects except those expressly prohibited items contained in the Orders."

Next month we shall start our regular series of photographic articles These will deal with a great variety of topics and will be thoroughly practical, bearing always in mind the owners of inexpensive and simple cameras as well as those who are the fortunate possessors of more costly instruments.

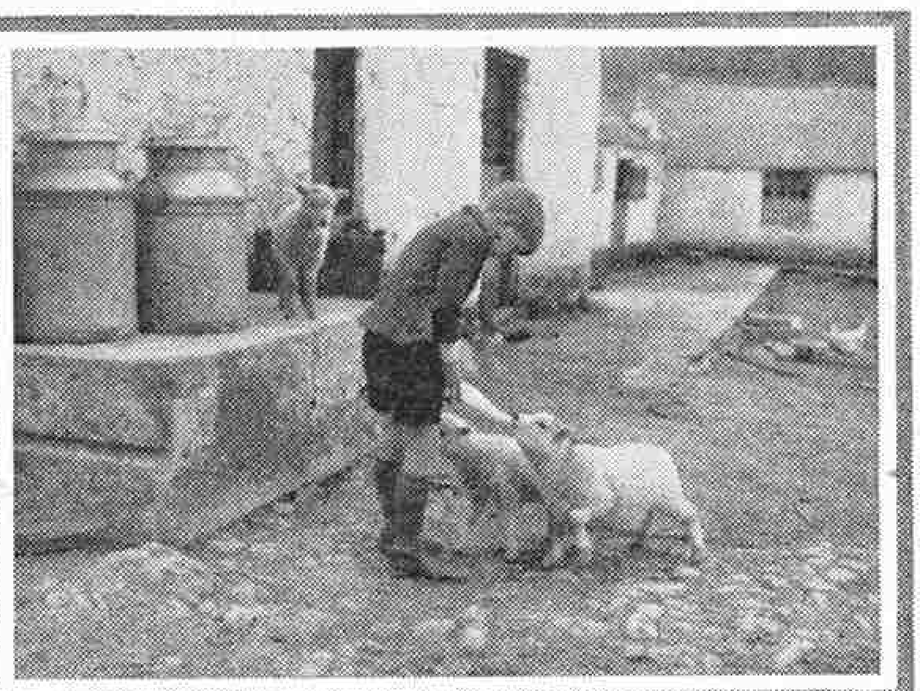












HORNBY RAILWAY COMPANY COMPETITION PAGE

Join the Hornby Railway Company and become eligible for the competitions announced on this page.

Join the Hornby Railway Company and become eligible for the competitions announced on this page.

"MISSING LINKS CONTEST"

It is evident that members, both young and old, are keen to exercise ingenuity in tracking down railway names of which only snatches are given, and thoroughly enjoy the fun. This month we are gratifying their desire for a competition of this kind by a "*Missing Links Contest.*" It is a considerable time since such a contest was announced on this page, and we shall expect to receive a large entry.

In the panel in the centre of this page are 32 mutilated names of well-known locomotives, stations and trains. The letters that have been omitted are represented by dashes, and H.R.C. members are set the pleasant task of replacing these by the appropriate letters. There is no catch in any of the words, and in spite of the strange appearance of many of the fragments each of these will be found to form part of a genuine railway name.

When competitors have discovered all the correct names, or as many as they can, they should make a neat list of them in the order in which they appear in the panel. Alongside each train name must be written the initials of the owning railway company, and the terminal points of the run. In the case of locomotives their wheel arrangements and class must be stated, and the names of the company or companies owning the stations included in the list also must be given.

The contest will be divided into two sections, Home and Overseas, each of which will be sub-divided, for Senior and Junior members respectively. In each of the four sections there will be prizes consisting of Hornby Train material or Meccano products, if preferred, to the value of 15/–, 10/6 and 5/– respectively. Several consolation prizes also will be awarded. As is usual in these contests, in the case of a tie for any prize preference will be given to the competitor whose attempt is presented in the neatest or most novel manner.

Members are reminded that the Senior Section includes all those who are 12 years of age or more. The Junior Section consists of members who have not yet reached the age of 12.

--O-D--	-D---UR--
--- -OY-- R---M-N-	C---Y- -A-
-O-T-R-U-A-S	--- --M-T
THE --L-E- -R-O-	--NCA---- R-----
-O-S-E- -IL-	-ORS--- ----T
-U-E -- ----AU--T	-E-D-A-O-
--W -R--H--N	-R--TO-
--A-IA-E--	-E-T--S - -O--
--- -A-C-S--I--	--- ----- H--H---D--
-E--I-IE--	-O-B-- ---RE--
----GO-L-N	--- --V--I-N
--A-I-A-D	--- --R--A-I-- -C--
T-- ----I-E --T-	---DIS- M--A--H
--I-H-O- -E---	---BR-D-- --LL-
--A--E -E---	--- I-I-H --IL
-I-C-R-I--S----	--E ---X-A-

Envelopes containing entries must be marked "*H.R.C. Missing Links Contest*" in the top left-hand corner and posted to reach Headquarters at Meccano Ltd., Binns Road, Liverpool 13, on or before 30th April. The entries from Overseas readers must be posted sufficiently early to reach this office not later than 31st July.

On the back of every entry submitted for this contest must be clearly indicated *four* separate items as follows: the sender's name, age, full postal address and H.R.C. membership number. It should be clearly understood that no entries can be accepted for this contest unless the competitors are members of the Hornby Railway Company. New readers who are not already members and who wish to compete, should write to Headquarters for a copy of the H.R.C. leaflet, on the back of which there is a form on which to make application for membership.

1940 Drawing Contest No. 3

This month we are announcing the third and last in the present series of Drawing Contests. We have received splendid entries in the first two of these, in which the subjects were locomotives of the past and of the present. Now we give members a splendid opportunity for exercising their imagination by drawing a locomotive of the future, and we are looking forward to some novel designs.

Competitors are asked to make a drawing of the kind of locomotive they think will be in use in the year 2000. Then steam engines may still be supreme, electric or Diesel engines may have displaced them, or some new form may have been brought into use. Members must make their own decisions on these points, and their efforts will be judged on their merits as drawings and on the imagination displayed.

The contest will be divided into the usual Home and Overseas sections, and prizes consisting of any goods manufactured by Meccano Ltd. to the value of 21/–, 15/– and 10/6 respectively will be awarded for the best efforts in each section. There will be several Consolation Prizes.

Envelopes containing entries should be marked "*H.R.C. Drawing Contest No. 3*" in the top left-hand corner and posted to reach Headquarters at Meccano Ltd., Binns Road, Liverpool 13, not later than 30th April. The Overseas closing date is 31st July.

On the back of each drawing submitted must appear the sender's name, full postal address, age and H.R.C. membership number.

H.R.C. COMPETITION RESULTS

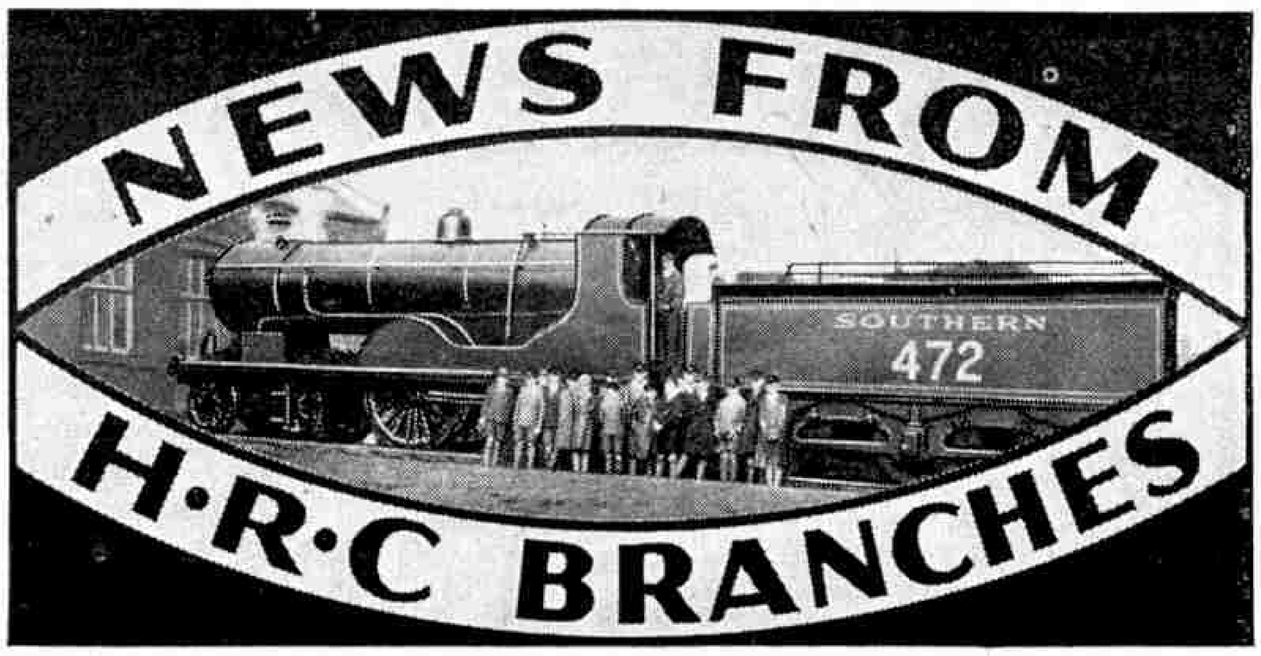
HOME

January "Locomotive Features Contest" (Senior Section).—First: A. GLEADEN (63978), Doncaster. Second: F. MILLS (31), Kearsley, Nr. Bolton. Third: D. I. GRANT (47298), Paignton, Devon. Fourth: D. T. STOTT (61750), Rochdale, Lancs. Consolation Prizes: J. H. WATERS (62750), Kingston, Surrey; C. HUGHES (65253), Southend-on-Sea, Essex; M. PROCTOR (65894), London S.E.2; H. D. FULLER (38303), Worthing, Sussex; A. MCINTYRE (30925), Paisley.

January "Puzzle Contest" (Junior Section).—First: R. MCKINNON (50283), Bellshill, Lanarkshire. Second: J. PEPLER (68134), Nantwich, Cheshire. Third: M. KEARNS (65423), Liverpool 18. Fourth: A. DE F. MELLOR (56817), Manchester. Consolation Prizes: M. GANDY (58529), Sheffield 8; J. HANMER (59602), Whitchurch, Salop; D. EDE (67400), London W.5; E. HAYTHORNTHWAITE (56578), New Malden, Surrey; M. ROBINS (61655), Clitheroe, Lancs.; R. W. COOKE (66405), Birmingham.

OVERSEAS

October "Layout Planning Contest."—First: K. R. CASSELLS (39510), Wellington S.W.1, New Zealand. Second: T. A. WADE (63755), Johannesburg, South Africa. Third: R. MYBURGH (37538), Cape Province, South Africa. Consolation Prizes: F. J. HARRISON (65068), S. Rhodesia, South Africa; D. MURISON (37642), Buenos Aires, South America.



CARMARTHEN.—A new track formation has been planned and brought into use, all members taking part in the work. Operations then were carried on at several meetings. The trains were run to a timetable, and among them were representations of the *"Cheltenham Spa Express"* and the *"Bristolian."* A weekly subscription has now been imposed in order to provide funds for the monthly Film Show. More games are enjoyed, including Skittles, Bagatelle, Table Tennis and Buccaneer. Secretary: J. D. Lewis, 7, Spilman Street, Carmarthen.

WIMBORNE GRAMMAR SCHOOL.—Membership has been increased in a satisfactory manner. The track has been dismantled and rebuilt to ensure that it shall be in perfect conditions for further operations. The telegraph and lighting systems are being completed. A Photographic Section is being organised for the purpose of taking railway photographs during the summer months. Secretary: R. J. Hall, Queen Elizabeth's Grammar School, Wimborne, Dorset.

ROSEDALE (KIDDERMINSTER)—The Branch has now settled down to normal working. A Junior Section has been formed and holds meetings separately from the Senior Section. Christmas was celebrated by a party, with games and competitions. During the cold spell arrangements were made to provide members with hot drinks at nominal prices. The proceeds were added to Branch funds. The Senior Section also has held a party. Secretary: A. D. Hamblin, 19, Katherine Road, Bearwood, Birmingham.

MAIDSTONE.—The Branch has now been merged in the Maidstone Model Railway and Engineering Club. The suggestion has been made to form a Junior Club to run in association with it, and this probably will be done when the services of a suitable leader are obtained for this Section. The Club has held very fine Exhibitions, in conjunction with which contests were arranged for silver cups kindly presented by interested friends. Members have a fine record of war-work in various spheres. Secretary: J. Elbourne, 91, Old Tovil Road, Maidstone.

HORNSEA.—Track meetings have been held by Junior and Senior Engineers. Alterations were made to the layout for both of these, and the Senior Engineers specialized in main line running, the climax coming with a realistic crash, "due to sabotage." The apprentices also carried out operations on the Branch track, running brick trains. Running was carried out with restricted lighting owing to supposed war conditions. Secretary: D. E. Parker, "Oak Dene," Burton Road, Hornsea.

PLYMOUTH.—Both Senior and Junior Sections have been busy on the Branch track. The latter is being extended, and members put in excellent work in spite of difficulties caused by the blackout and other war conditions. Great interest is taken in single line working, on which the staff



Our photograph this month shows R. Bower, secretary of the South West Hounslow Branch No. 370, Leader, Mr. T. Tappin. This Branch was incorporated in February 1939. At most meetings operations are carried out on an extensive layout on which four trains can be run at once on separate tracks. Games also are played.

system is employed, as in real railway practice. It is hoped to devise automatic gear for picking up the staff at speed. Signal schemes also are being worked out. Tender engines are used on through trains, and a station pilot engine is provided at each terminal to shunt trains from arrival to departure platforms. Secretary: A. E. Miller, 21, Hamilton Gardens, Mutley, Plymouth.

BEDFORD SCHOOL.—The track has been renovated, and locomotives and rolling stock have been sorted to the various stations. Half-hour timetables have been run with great success, and a new one has been worked out. Close watch is kept on running in order to assess the need for repairs, and track relaying is carried out when necessary. Film shows are to be included in the programme in order to make proceedings more attractive to prospective members. The electrification of the "Tilbury" Branch is making good progress. Secretary: F. E. B. Webb, 59, Rosamond Road, Bedford.

KINGLASSIE.—An interesting programme is being followed by this newly incorporated Branch. At track meetings excellent passenger services are run. The locomotives employed are "Eton" and "Bramham Moor." A special feature is made of L.N.E.R. trains. Mr. Drysdale, father of one of the members, is constructing a station for use on the Branch layout. A recruiting meeting has been arranged, to which every member is expected to bring a friend who is likely to join the Branch. Secretary: W. Duncan, "Helen Dhu," Kinglassie, Cardenden, Fife.

BURY ST. EDMUNDS.—Most of the meetings are devoted to track operations, and to some of them parents and friends of members are invited. The track has been re-designed to represent the L.N.E.R. main line between King's Cross and Newcastle, with a branch to Scarborough. L.M.S. trains, representing through services from Manchester to York and Newcastle, also run over part of the main line. Every member carries out his share of operations with great thoroughness. Games also are played, and Talks have been given by members on their hobbies. Other interesting events have included Lectures on *"London Stations," "Britain's Fighting Aircraft"* and *"Goods Trains."* At a Social Evening a programme of records was enjoyed. Secretary: T. S. West, 10, Crown Street, Bury St. Edmunds.

NORTH BRITISH MODEL SOCIETY.—Activities continue in Dundee in spite of various difficulties. The Library is open to members and it is hoped to make arrangements for meetings. The Glen Ogilvy Branch is expected to resume meetings. In Edinburgh a private Branch has been opened. A track has been built up, and is to be electrified. Secretary: T. A. Sharpe, 12, King Street, Dundee.

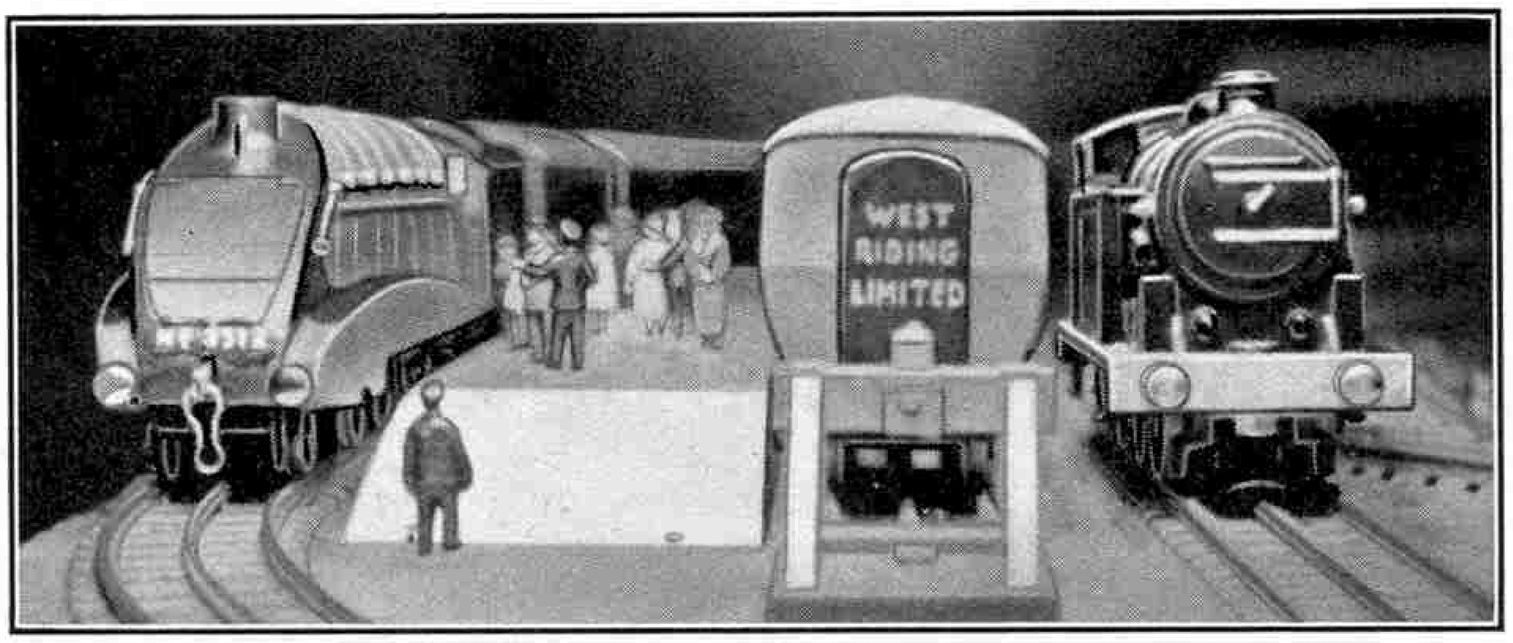
Proposed Branches

The following new Branches of the Hornby Railway Company are at present in process of formation, and any boys who are interested should communicate with the promoters, whose names and addresses are given below.

APPLEBY—J. Cunliffe, King's Head Hotel, Appleby, Westmorland.
BLACKPOOL—J. C. Holmes, Progress Private Hotel, 653, New South Promenade, South Shore.
BRIDLINGTON—J. Couch, 15, St. George's Avenue.
GERRARDS CROSS—M. H. Heycock, Corner House.
GOUDHURST—J. Cookledge, Bethany School, Goudhurst.
GREENFORD—F. Stanford, 88, Robin Hood Way.
LIGHTWATER—I. E. Johnston, The Folly, Lightwater.
LIVERPOOL 13—T. S. Power, 16, Malleson Road, Clubmoor.
LONDON N.5—J. R. Allison, 14a, Highbury Place, Highbury.
LONDON S.E.12—N. Berry, 85, Chinbrook Road, Grove Park.
LONDON W.4—T. B. Seymour, 110, High Road, Chiswick.
NEWCASTLE-ON-TYNE—J. Gate, 595, Wellecker Road, Walker.
NOTTINGHAM—K. Astill, 31, Colville Street, Forest Road.
RAINHAM—W. Crathern, Central Cafe, New Road.
RUGBY—D. G. Favell, 68b, Studland Avenue.

Fun with a Hornby-Dublo Layout

King's Cross to Peterborough in Gauge 00



Journey's end! No. 2512 "Silver Fox" has just arrived, while the "West Riding Limited," distinguished by its titled corridor shutter, is waiting to depart.

WITH the development of the Hornby-Dublo railway system the operation of layouts based on sections of actual main lines is becoming more and more popular. A notable example of this type of system is shown in the photographs reproduced on this page. These show the Hornby-Dublo L.N.E.R. layout operated by Eric Oldham, H.R.C. No. 43390, of Hyde, Cheshire. Working on this railway represents as far as possible that of the L.N.E.R. East Coast main line between King's Cross and Peterborough. The points and signals are of the latest electrically-operated type, and the railway is divided into 12 separate sections so that several locomotives can be on the track at once.

"King's Cross" is a very complete terminal, roofed over just as in the original by two arched roof spans. Near to the passenger station is "King's Cross Goods," a busy depot to which two tracks give access from the main line. At both these stations, and elsewhere on the line, the miniature figures of the Hornby-Dublo range are used with good effect.

Apart from buildings and equipment of a railway character, the provision of lineside effects has had special attention. Trees of various kinds have been "grown" from pieces of loofah dyed or painted green, and a good example of attractive building is the half-timbered house shown in one of the illustrations. This was constructed of cardboard, the timbering visible on the outside being formed by flat wooden spills.

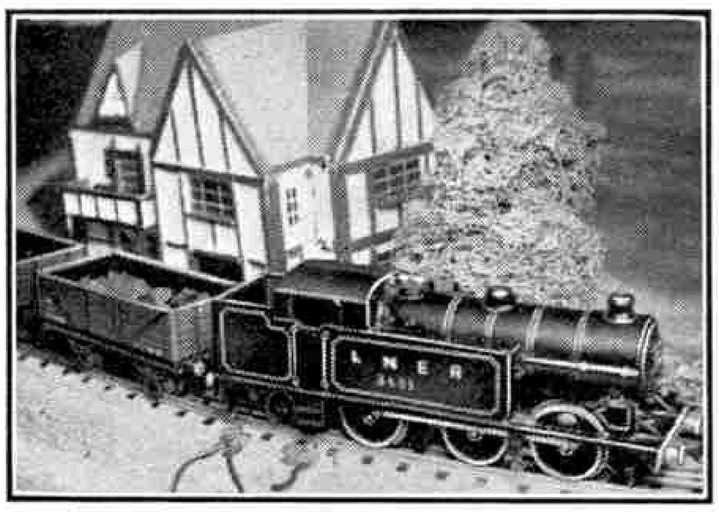
Regular working programmes are carried out, and engines and stock have their rostered times of duty, engines working down trains being returned to the terminus after a suitable interval on regular up trains. Trains also have their regular make-up.

As in L.N.E.R. practice, all the coaches of the principal expresses carry name-boards, and the corridor "shutters" of the end vehicles also display the train names as shown by the tail-end view of the *"West Riding Limited."* Oldham has solved the problem of fitting nameboards on so small a scale in an ingenious and effective manner. The following is his description of the method he has applied so successfully: "To make these nameboards I cut strips of thin white card to the correct size. Then in Indian ink I write on the required title, such as *"The Flying Scotsman."* The next step is to cut strips of adhesive tape slightly smaller in length and breadth than the actual nameboards. Each strip is glued on its non-adhesive side to a nameboard, thus leaving the adhesive side showing. The board can then be placed on the coach roof and will stay on satisfactorily; yet at the same time it can be removed if not required. I also make nameboards for placing on the front of the engines, as used in L.N.E.R. practice, in the same manner."

Oldham is skilful with pen and brush and has provided the effective red lining that can be seen on one of his standard Hornby-Dublo 0–6–2 tanks in the illustration where the half-timbered house is featured. A notable effort too is his changing the identity of one of the streamlined "Pacifics," so that there shall not be two engines bearing the same name and number. Thus in addition to the standard model No. 4498, *"Sir Nigel Gresley,"* he has a similar engine No. 2512, *"Silver Fox,"* one of the best known of the earlier streamliners. On this model he has introduced the characteristic stainless steel bands that decorate the boiler clothing, also the emblem in the shape of a silver fox that is placed about midway along the side of the engine.

"Peterborough" on the model, though not in actual practice, forms an engine-changing station. This is a very convenient subterfuge for explaining the attachment and detachment of engines there of trains that are supposed to proceed to or to have come from much further away. So an engine that works down from "King's Cross" on a passenger train will come off at "Peterborough" and perhaps return on a fast freight train. Let us make an imaginary trip up from "Peterborough"

Looking at the working sheet we find that No. 4428 *"Sir Nigel Gresley,"* having worked down a passenger express and being required to take *"The Flying Scotsman"* out of "King's Cross" on its next down run, is booked to work up a "fitted freight" of six vans and a brake. At the locomotive depot we find No. 4498 ready. On the next road is a 0–6–2 tank, "off duty" and waiting

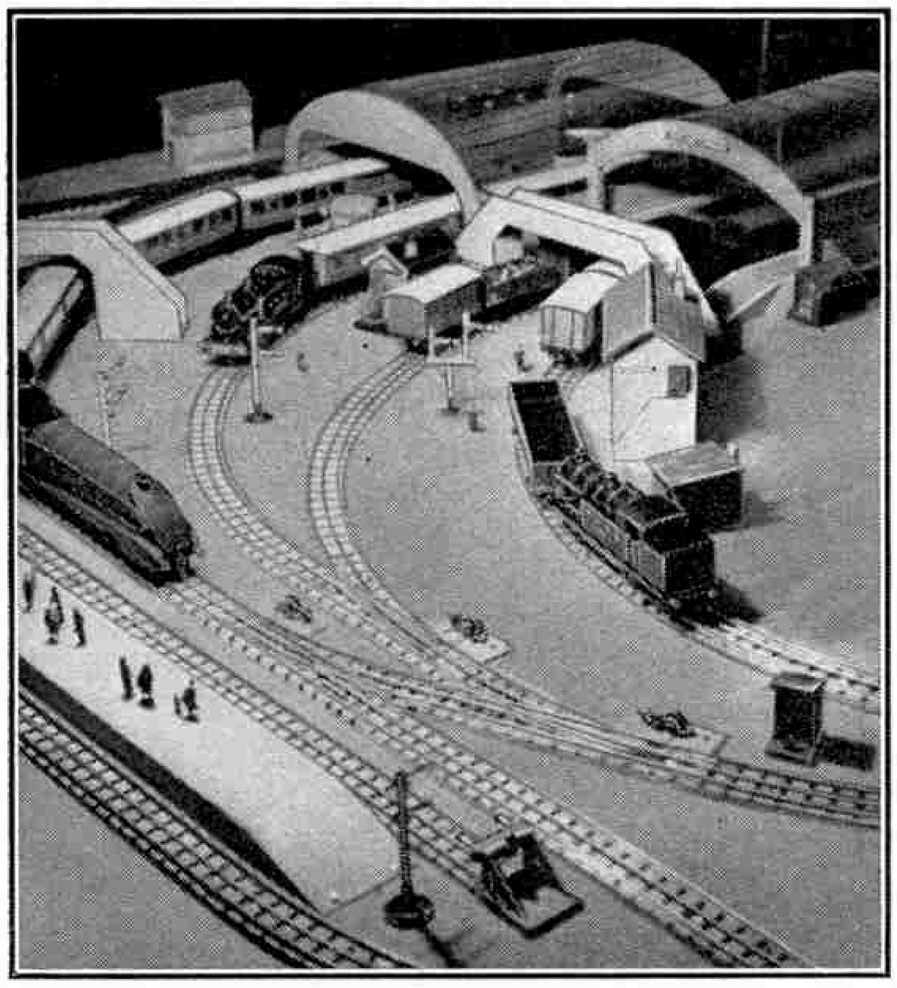


Hornby-Dublo 0-6-2 tank passing one of the attractive houses along the line. Note the "tree."

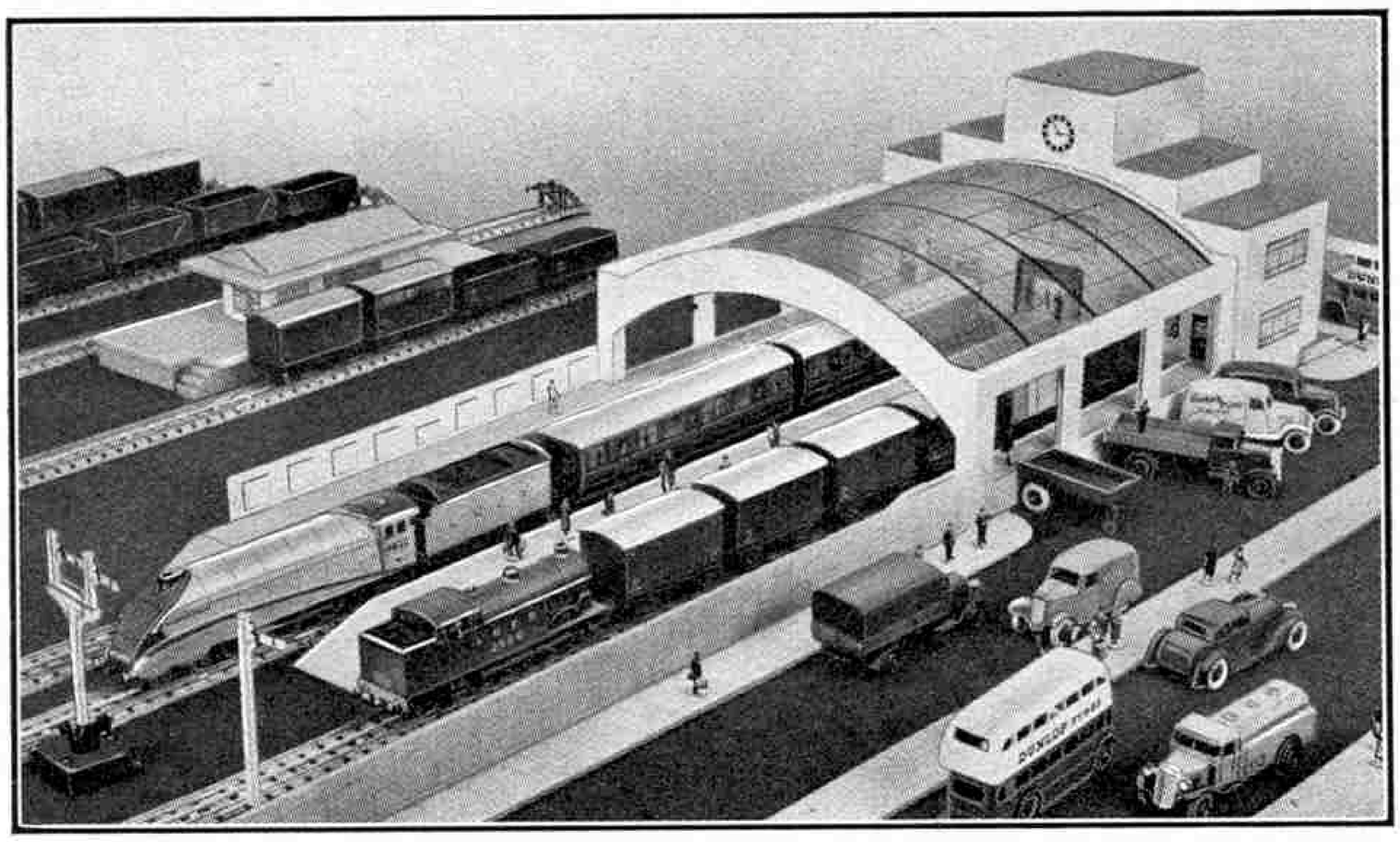
to be cleaned. Our train is waiting, having supposedly been brought up from the North by another locomotive; so when our signal shows "clear" we move slowly over the points leading to the track on which it stands. Now we back gently up to the waiting vehicles, picking them up with a click of the automatic couplings. The starting signal clears, and we are off.

We get away well for the 27-mile stretch to the next stop, "Huntingdon," this distance being represented by 27 circuits of the main line. This run is covered without incident and soon we ease up and make a gentle stop alongside the goods station at "Huntingdon." Here a routine examination of the train is made and we set off once more for "King's Cross Goods." Further circuits of the track take us past "Hitchin," the outer suburban stations, "Hatfield," "Finsbury Park"—nearly home now!—and finally we crawl into our berth at "King's Cross Goods." Here a busy 0–6–2 tank disposes of our train and our streamliner makes for the sheds.

Later we see No. 4498 depart again for the North with *"The Flying Scotsman."* Prowling round the station we see the coaches for the *"Scarborough Flyer"* brought in empty; soon another "Pacific" appears, this time No. 2512 *"Silver Fox,"* and takes charge of the train. Then it too departs "northwards" and so watching the titled corridor shutter at its tail end fade into the distance we take our leave of this interesting railway.



"King's Cross" stations on Eric Oldham's layout (photographed before electrically-operated points were installed).



An interesting terminus made up with the components of the City Station Outfit. Note the motor vehicles backed up to the openings in the side wall.

Fun with Your Hornby-Dublo Railway

City Station Outfit and the Engine Shed

MENTION has been made in previous issues of the new City Station Outfit and the new Engine Shed for Hornby-Dublo railways. In this article we deal with these splendid accessories and give suggestions regarding their use.

The City Station Outfit consists of a number of component parts designed to be used together so that they form either a terminus station or a main line .through station. The largest component is the Station Building, arranged as a block of offices with a central entrance, above which there rises an imposing clock tower. On the "street" side there is a flight of steps running the length of the building, by which intending passengers reach the platform level. Over these steps is an awning that finishes off the approach in a realistic manner. Details such as the entrance itself, the windows and the clock face are reproduced by transfers. On the "railway" side of the building the inside end of the entrance hall is shown, and there are in addition a bookstall and a tobacco stall.

The Arched Roof section consists of two side walls each built up on a length of platform, the walls being connected at the ends by the roof bows which are supported on pillars. Between the ends there runs the arched "glazed" roof consisting of a sheet of celluloid. In each side wall three panels are formed; these are removable and the purpose of this will be observed later.

The platforms incorporated in the Arched Roof section are extended by means of the Side Platforms, of which there are two in each Outfit. These are provided on their outer sides with walls finished to represent moulded inset panelling.

As the Outfit is intended to form a three-road station, either as a terminus or as a through station, an island platform for use in the centre of the station is required. This is provided for by the two lengths of Centre Platform. This Platform is wider than the Side Platforms. Sloping ramps of suitable width complete the outer ends of both types of platform.

For use at the inner ends of the platforms of a terminus are the Platform Buffers. These are of two kinds, Single and Double. The Single ones are intended to terminate a single track, and consist of a buffer beam with spring buffers mounted on a section of platform of exactly the right size to fit between a side platform and a centre platform with a single track between them. The Double type of Platform buffers are of similar design and are intended to terminate two double tracks. With the Single type Buffer unit already in place, the Double type exactly fills the space remaining between the Centre Platform and the side platform.

Let us now see how we use these components to make up a terminus station. The Station Building is placed in position and the Arched Roof section is then made to butt up to the "railway" side of it. The next step will depend on the layout of the roads in the station. If we decide to have a single track for local arrivals and departures on the right-hand side of the station when looking outward from the building end, we place the Single type of Platform Buffer in position. Then we can lay in the centre Platform, the inner section of which is made to meet the Station Building, and to join at right angles to the Platform Buffer already in place. The local road is thus served by two platform faces.

The Double type of Platform Buffer too will be found to fit into position between the Centre Platform and the side platform on the left-hand side of the station. The platforms are extended beyond the roofed-over section by means of the Side Platform and Centre Platform sections, and the outer ends of these are finished off by the ramp provided.

When we have finished we find that we have two narrow or side platform ramps and one wider or centre platform ramp left over. These are required only when a through station with ramps at each end of the platform is being made up.

We now have an excellent terminus station in which all the hurry and bustle common to real termini can be introduced by means of the Miniature Railway Staff D1 and Miniature Passenger D2.

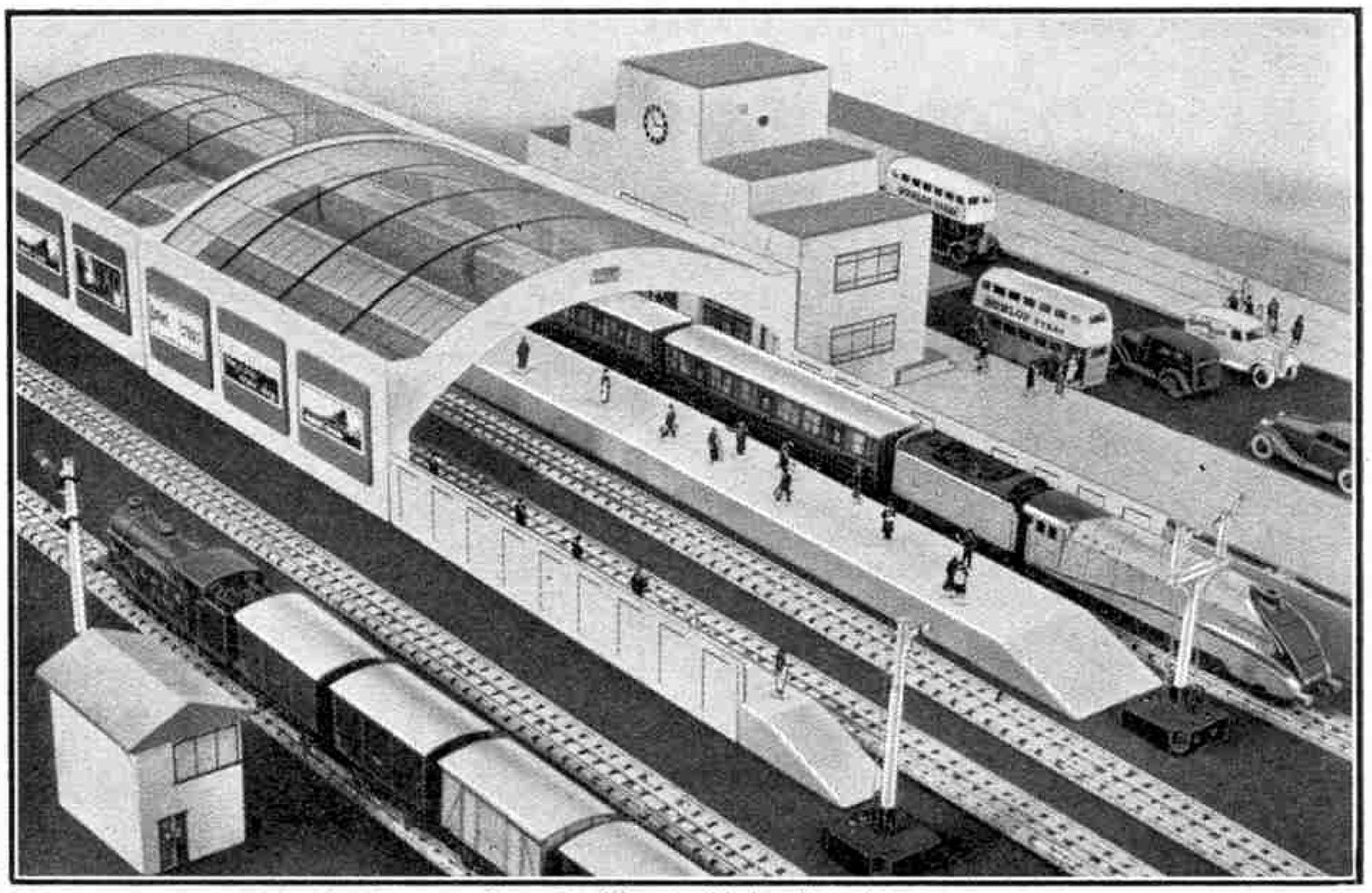
We have described what may be called a standard arrangement of the components of the City Station Outfit in building up a terminus. Variations can be introduced to suit particular circumstances and layouts, and the fact that the components of the Outfit can be obtained separately gives a great deal of scope in the development of interesting station schemes. One suggestion that may appeal to some readers is shown in the illustration on this page. Here one side platform and the centre island platform have been extended, main line trains being dealt with on the tracks lying between them. The remaining track on the opposite side of the island platform can be used for local

trains, which are accommodated at this platform face. The other side platform, also served by the same track, is shorter than the other platforms. It is reserved for parcels and perishable traffic of the kind often dealt with at a passenger terminus. On this side the three panels of the side wall of the Arched Roof section have been removed. This allows road motor vehicles—Dinky Toys of course—to be backed up to the openings, thus giving access to the platform concerned.

These panels also have to be removed when it is intended to make up a through station from the City Station Outfit components. The Station Building is then placed at the side of the Arched Roof Section, the removable panels being spaced so that they allow the printed details on the "railway" side of the building to show through the openings in the side wall. This applies whichever side of the Arched Roof the Station Building has to be placed.

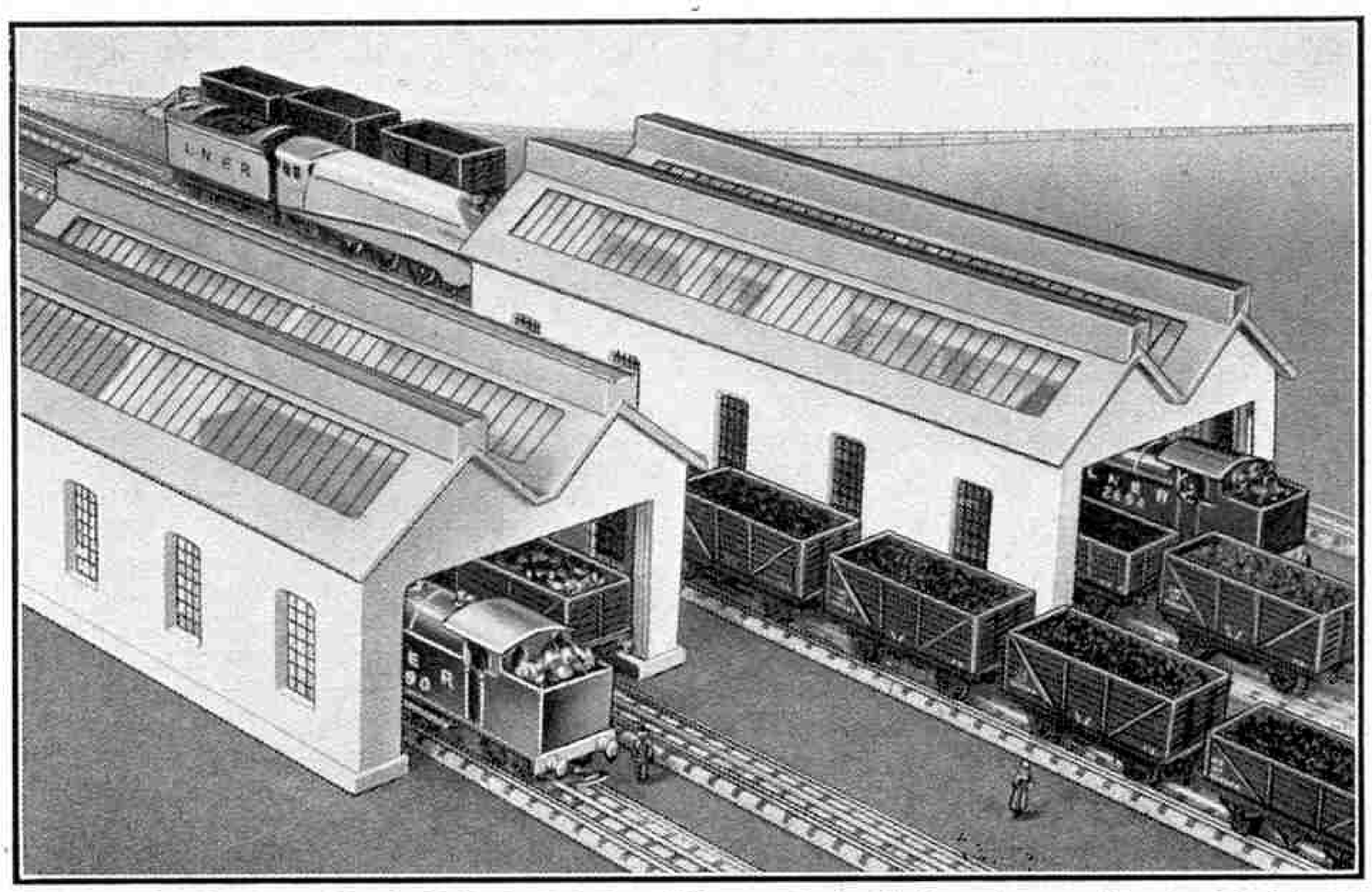
An imposing through station made up in this way is shown in the upper illustration on this page. There the whole station has been extended by the incorporation of an additional Arched Roof section and, inside it, a further length of Centre Platform.

When a through station is assembled the Platform Buffers are not required, but the platform Ramps that are left over in the Terminus arrangement are then required to complete the platforms. It is not necessary to make all three roads of the through station run



A busy through station. The use of two Roof Spans adds length to the station and gives a realistic effect.

right through the station. It is often desirable to have a combined terminus and passing station on a layout, and it is possible to arrange this with the City Station Outfit components. In this case the single track line can be terminated by the Single type of Platform Buffers, but the Centre Platform and the other side platform can be finished off with ramps, the two lines of the double track serving them being carried on outside the station. This is a useful arrangement where a branch line train has to be accommodated at a junction station. It keeps the branch line train clear of the main line traffic, and simplifies both operation and control arrangements.



The locomotive depot on a Hornby-Dublo layout. Two of the new Engine Sheds are in use, with a track in between them for coal wagons.

An interesting "halt" of the wayside type can be made up of two of the Side Platform sections with the appropriate ramps.

An engine shed is invariably found near to important termini or through stations and the new Hornby-Dublo Engine Shed represents the latest practice in such buildings. It is a two-road structure with the roof formed in two bays, its width being correct for the standard adopted for Hornby-Dublo railways where double track is in use. In length it is sufficient for the accommodation of a Hornby-Dublo express engine and tender, or two tank engines on each road. The peak of each bay of the roof is crowned by a smoke vent running lengthways. The roof has openings glazed with celluloid and there are openings in each side wall similarly finished, glazing bars being represented on the celluloid sheets in each case. The shed is therefore well lighted, and from the model point of view has the attraction that the engines "at home" within can easily be seen.

Each Shed is an independent unit and in the main is sufficiently large for average requirements on a line where several Sheds are in use. Sometimes the model railway owner prefers to concentrate his engine power at one main depot. When this is done, although the new Engine Sheds cannot be used together end-on, or immediately side by side, they can be placed as shown in the lower illustration on this page. Here a line reserved for standing Coal Wagons supplying the depot with coal passes between the two Engine Sheds.

Hornby Gauge 0 Clockwork Locomotives

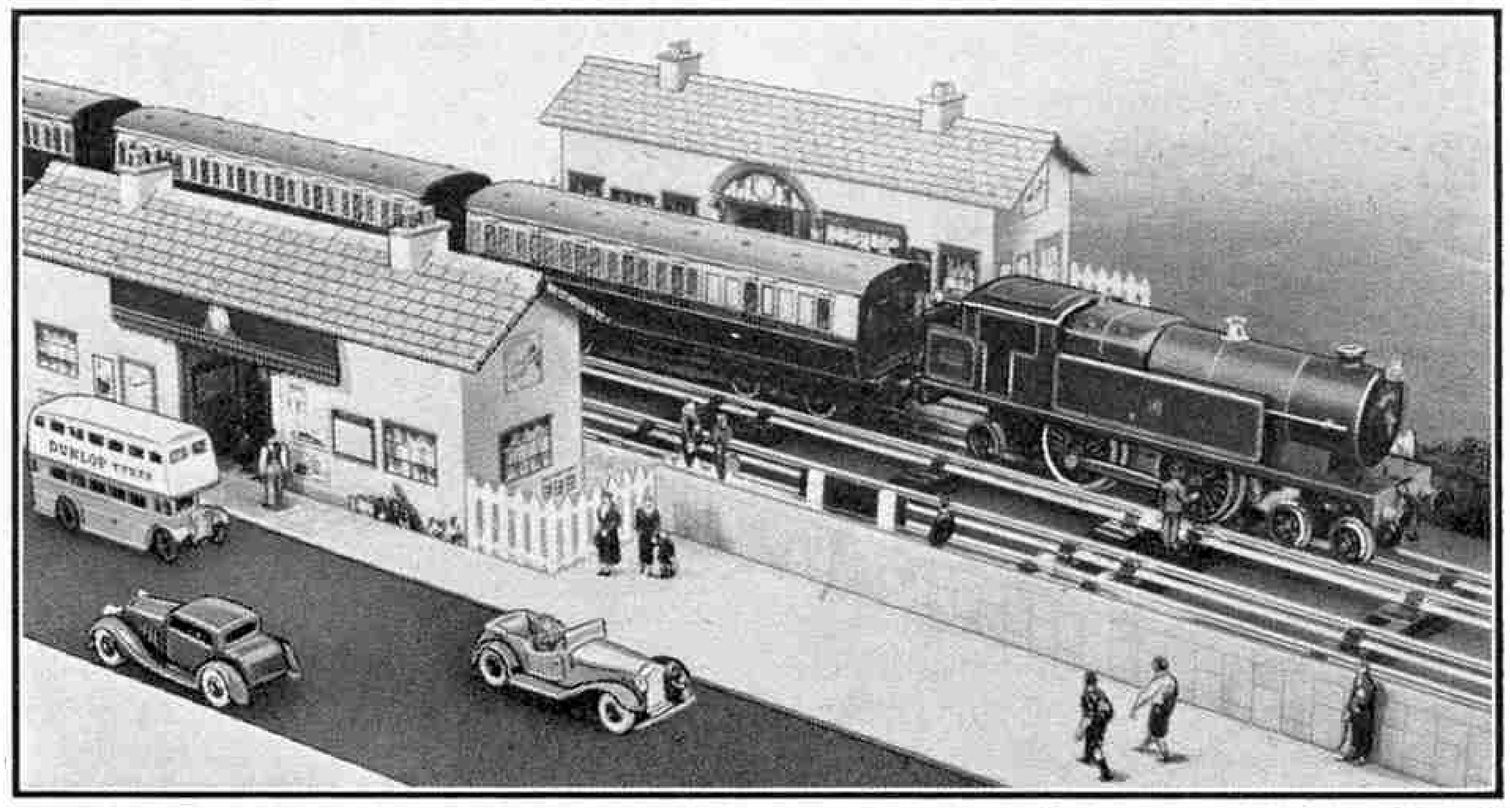
How to Obtain the Best Running Results

ALTHOUGH Hornby Electric Railways necessarily claim a good deal of attention in these pages nowadays, the clockwork locomotive is still a favourite with many miniature railway owners. Hornby Clockwork Locomotives are in a class by themselves, and in this article we give some hints to help users of these engines to obtain the best results.

Many clockwork railway enthusiasts fail to obtain really satisfactory running because of their neglect of certain details that the experienced operator knows to be necessary. It must be realised that the power of even the largest clockwork locomotive is limited; it is necessary therefore to make things as easy as possible for the engine, so that it will show its power and speed to advantage. Causes of undue resistance and friction must be done away with.

The first requirement to obtain good running is to have a satisfactory track. The rails must be laid on an even surface and the rail joints must be well made; that is, the rails must be well pushed up to one another, and on temporary layouts especially the Rail Connection Plates should never be omitted. The correct number of curved rails for a particular formation should always be used, and care should be taken not to force the rails into the position required. Often a little adjustment by means of the very useful Half or Quarter Rails makes all the difference between a strained track and a well-fitting layout.

Any reader who is doubtful about a particular formation and who cannot work out the rails required should get in touch with H.R.C. Headquarters. Before doing so, however, he should make sure that the layout he has in mind is not included in any of the designs published in the literature of Meccano Ltd., such as the useful booklet mentioned last month, *"Hornby Gauge 0 Layouts, 60 Suggestions."*



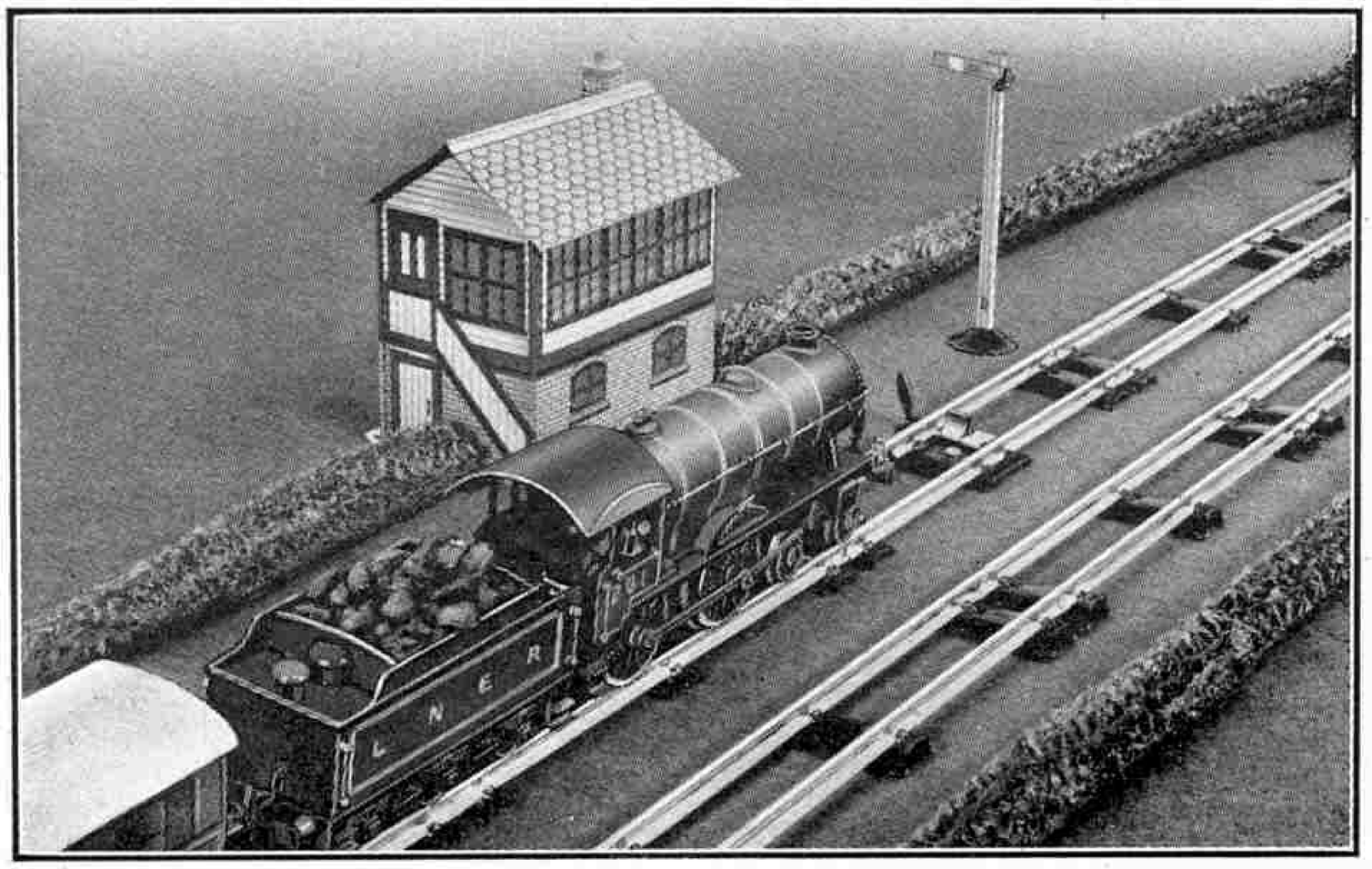
Smart running between stops is characteristic of suburban trains. Clockwork engines, such as the No. 2 Special Tank, are specially suitable for this type of work.

The rails on permanent layouts should not be screwed down too tightly, there should always be a slight amount of "give" between the baseboard and the track, or harsh and noisy running will result. In extreme cases even derailments can be caused owing to the gauge of the rails being reduced through the sleepers being screwed down to an excessive extent. Remember that real track always "gives" slightly under the weight of the trains. It is as well always to test the gauge of the rails each time a temporary layout is put down, and the same operation should be carried out periodically on permanent tracks, especially if any alterations in design have been made. The key handle of Hornby Clockwork Locomotives forms a rail gauge and its use is detailed in the instructions packed with each engine and train set.

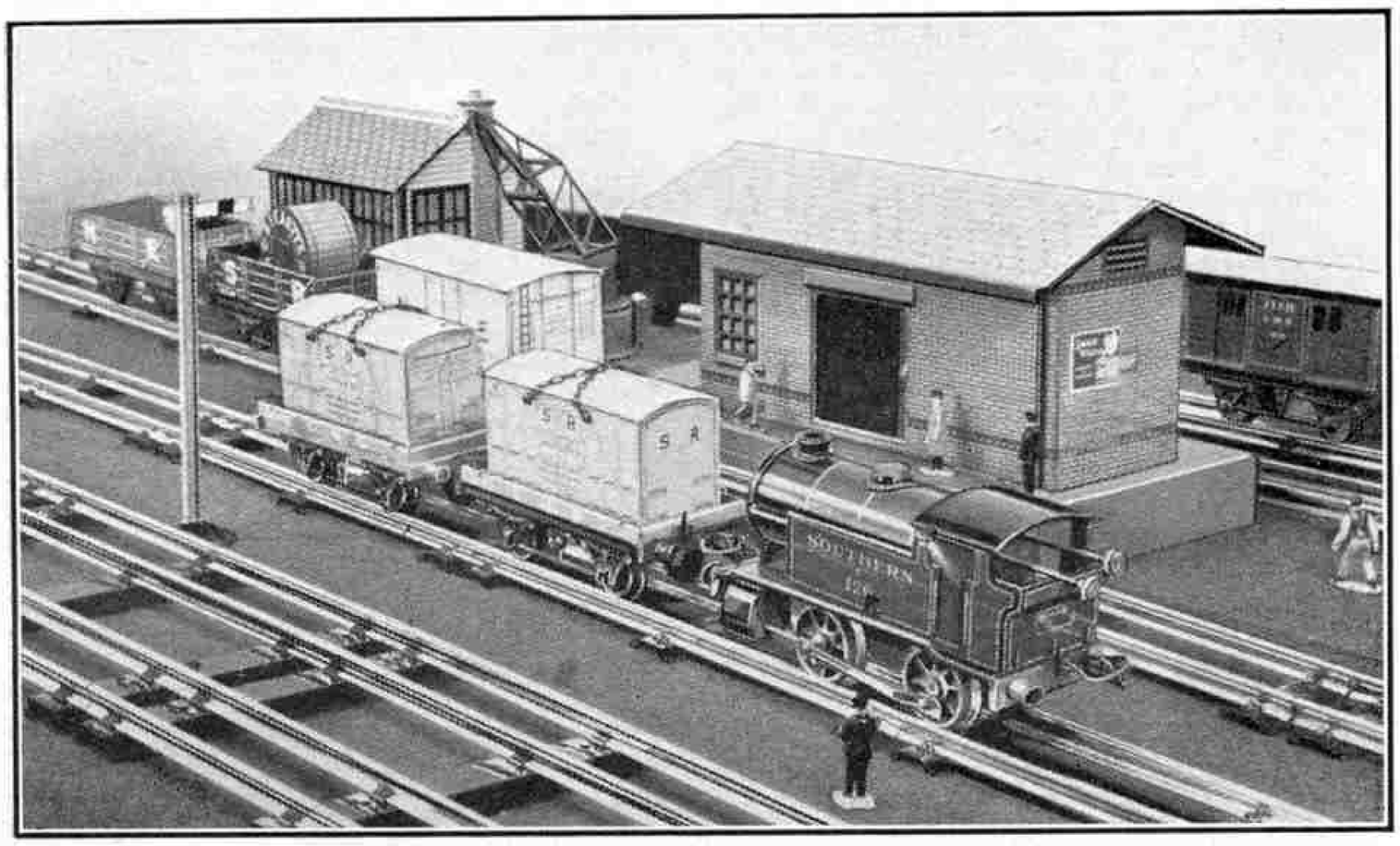
In course of time the track becomes greasy owing to oil from the engines and rolling stock finding its way from the axles on to the wheel treads and so on to the track. This may be due to over-oiling, or to periods of intensive running; in either case the remedy is the same. Wipe the rail heads over carefully with a clean dry rag or one that has been damped with just the slightest trace of petrol. Do not, even in these days of petrol rationing, use paraffin; it is too oily, and the track will remain just as slippery as before.

Wiping over a permanent layout is necessary at intervals; dust settles on the rails if they are the slightest bit oily, and the two become rolled into a black pasty-looking substance. Some of this stays on the rails and some of it is picked up by the wheels of the engines and stock. What we may term "woolly" running is the result, and in extreme cases derailments have been known to be caused by the building up of this "paste" on the wheel treads. Quite apart from that it adds tremendously to train resistance and reduces the power and length of run of the engine. Where wheels are found to be coated with this material they should be carefully wiped clean, again with a slightly damp petrol rag.

Assuming that the track is in order and quite clean, let us turn to the engines and rolling stock. It is rarely that a tight place is found on the locomotives themselves, but the outside wheel frames of tenders and rolling stock can press on the axle ends or the wheels themselves, and so cause friction. New stock particularly should be examined for this, as sometimes in course of packing the wheel frames may become bent inward slightly. To avoid any binding from this cause the frames should be eased outward gently, and at the same time a drop of Meccano Lubricating Oil on the



The BBR1 Brake and Reverse Rail in use. The signal is at "danger," so the brake trip is set to stop the train.



Shunting in progress. Such work is easily possible with clockwork engines by using the method described.

axle bearings is beneficial.

With regard to the locomotives, it is scarcely necessary to point out the necessity of lubricating the mechanism. It is a mistake however to use too much oil, as this finds its way all over the engine and attracts dust, resulting in an untidy and "messy" appearance. New engines always require special attention to lubrication in order to help in working off the stiffness that exists in new machinery of any kind. This explains why the performance of a new engine gradually improves with use. Correct lubrication of the spindle bearings, gear wheels, axles, and such parts as crank pins, slide bars and piston rods, is assured by the use of the Meccano "K" type Oil Can. The flow of oil is controlled by a button, and the oil can be placed drop by drop exactly where it is wanted anywhere in the mechanism. Bogie wheel axles also need a drop of oil, and for the free pivoting of the bogie truck the washer and spring on the bogie pin should be oiled.

The use of too thick oil retards a clockwork mechanism instead of assisting it to work efficiently, and the gummy nature of such oils causes dust to collect and clog the mechanism. A falling off in performance results, to the disappointment of the "Chief Mechanical Engineer" of the line. Here again petrol is most useful, and should be passed through the mechanism in the same way in which the engine is lubricated. A special oil can should be kept for this purpose alone, and after the petrol has been applied to the mechanism the engine should be stood in an old tin box lid or tray so that the liquid can work its way out of the mechanism and drip down without doing any damage.

This is a job that should be tackled in the open air for preference, and always well away from any fire or flames. It is not a bad plan, while the petrol is in the mechanism, to give a few turns of the key and allow the driving wheels to revolve slowly while the engine is held upright in the hands. This helps the dirt and old oil to work out of the mechanism. A thin bottle brush too is a useful tool for a clockwork locomotive's "shed day," and can be employed to brush out any dirt that persists in adhering to any internal moving parts. When the mechanism is clean and has dried out, but not before, the moving parts should be oiled as described previously.

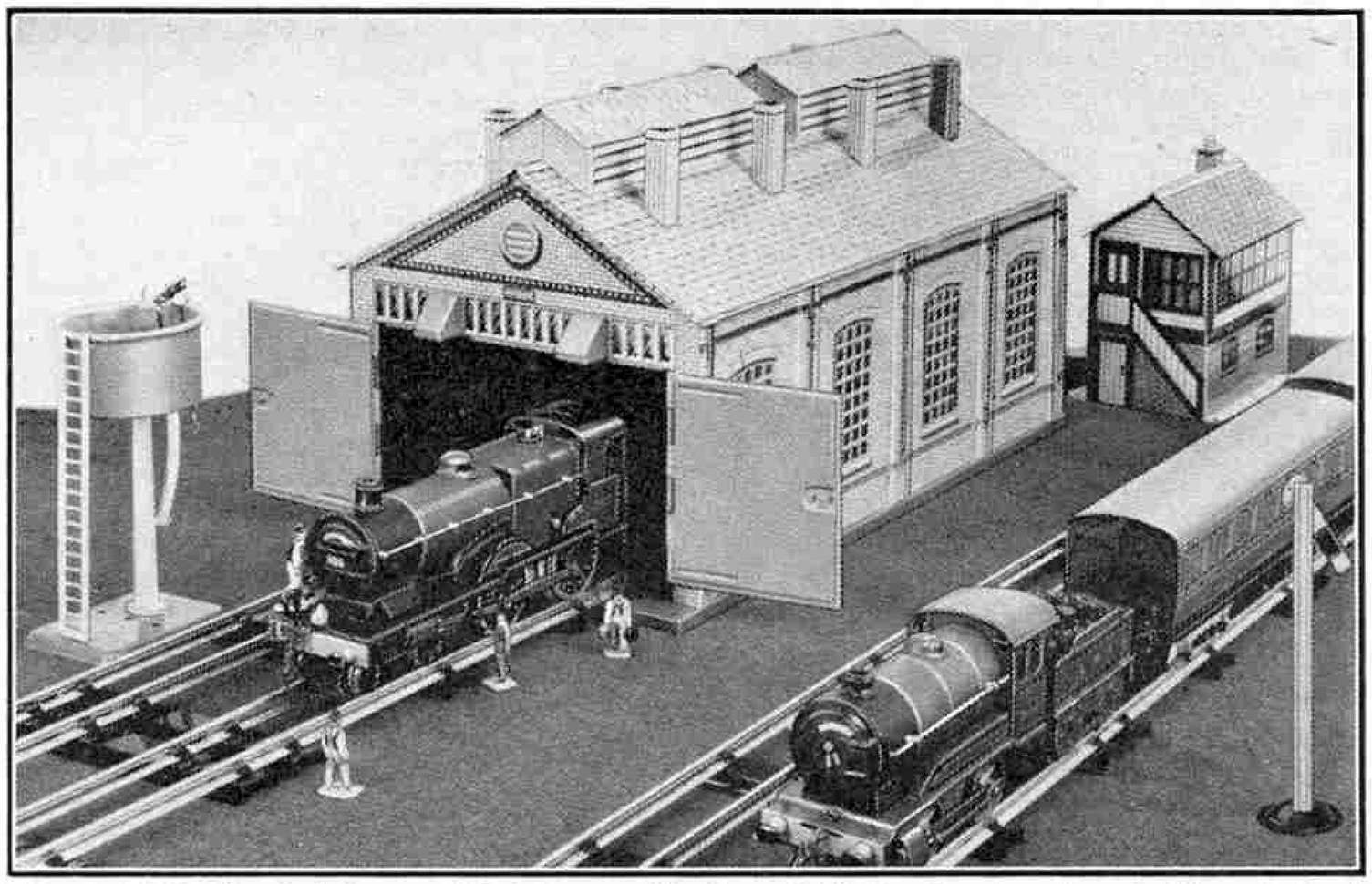
Matters of this kind will be attended to as part of the regular maintenance of the system by the Hornby Railway owner who wishes his engines to do all he requires of them. Then the regularity of running characteristic of all good clockwork engines can be made use of to run the various services on the line in a systematic manner. To find out the capabilities of each engine a series of tests with different loads should be carried out and the results carefully noted. Runs from point to point should be made, and the number of turns of the key required should be jotted down. This requires some practice in order to obtain the exact results aimed at, but it is quite fascinating, and is certainly more entertaining than the mere haphazard running of trains with no particular object in view.

When the results have been noted down the preparation of a working scheme on the lines suggested in the Hornby Railway Company Senior Booklet can be prepared. Even shunting movements can be carried out to perfection if a little careful experimenting is first done. Obviously if an engine is fully wound and then the attempt is made to shunt two or three wagons, the speed will be too high for realism and will certainly prevent successful manipulation of the Shunters'-Pole. The engine therefore should be given just sufficient turns of the key for each movement to be made. The pauses necessary between each move have a most realistic effect, and the winding up is not very noticeable.

If the right steps are taken a clockwork engine is a reliable and controllable unit of motive power. In addition, the braking, and in many cases the reversing, of Hornby Clockwork Locomotives can be governed from the track by means of the various Brake and Brake and Reversing Rails that are available. These can be used to stop the trains when required at signals and so on. To obtain the best results the train should not be travelling at its highest speed. Some discretion therefore is necessary when making use of these accessories.

It is important to note that the appropriate Brake or Brake and Reverse Rail for the particular engine in use should be provided. Sometimes we receive letters from Hornby Railway owners stating that their engine will not reverse or cannot be braked from the track. In almost every case the cause is the employment of an incorrect Brake or Brake and Reverse Rail. The simplest Brake Rail is the MB9 Curved Brake Rail, which is suitable only for the M0, No. 0 Streamlined and No. 0 "Silver Link" Locomotives. The BB1 Straight Brake Rail can be used only for the M1, M3 Tank and No. 0 Locomotives; these have to be reversed by hand by means of the reversing rod in the cab. No. 1 Locomotives, both tender and tank, require the AB2 Curved Brake Rail to operate their braking or reversing mechanism. All the larger engines, such as the No. 1 Specials, the No. 2 Specials, and the No. 3C and No. 4C "Eton" Locomotives, are controlled only by means of the BBR1 Brake and Reverse Rail.

When the brake or reversing lever on a clockwork engine is operated by hand, care should be taken to see that the levers are always pushed fully in or pulled fully out. It is specially important to do this in the case of the reversing lever, in order to make sure that the appropriate gears are properly in mesh.



A Hornby L.M.S. "Standard Compound" being prepared for the road. Clockwork engines give splendid results if well used and cared for.

New Dinky Toys

This month's addition to the range of Dinky Toys is the attractive scale model of the Vickers-Supermarine "Spitfire" Fighter announced on page v. It is available in Camouflage (Dinky Toys No. 62e) or in Aluminium finish (Dinky Toys No. 62a). The "Spitfire" has already given a very good account of itself in war service, and its victims have included many enemy Heinkel raiders. The first German raider to fall on British soil was a Heinkel bomber brought down near St. Abb's Head on 28th October last year by Squadron Leader Farquhar, a young Scottish Auxiliary Air Force pilot flying a "Spitfire." He has since accounted for two more enemy aircraft.

The "Spitfire" is one of the fastest fighter aircraft used by the Royal Air Force, and when fitted with a 1,030 h.p. Rolls-Royce "Merlin" II engine it has a speed of 367 m.p.h. It is heavily armed, and has eight fixed machine guns in the wings.

A Day Out for the Bombers—

(*Continued from page 163*)

One "Wellington" was well below its correct height, obviously in difficulties. Another was already making for home out of formation, as instructed if hit during the action.

Lastly, above Sylt, he saw silhouetted on the clear sky certain specks that could mean one thing only. The interceptors were up! He flew up alongside the leader and waggled his wings—the time-honoured way of indicating "I have sighted the enemy."

Still flying at well over four miles a minute, the "Wellingtons" closed up in much tighter formation, as their best means of protecting themselves against attack.

This was, to the pilot, the worst time of all. He could see nothing of the machines that were closing in on him at about 100 m.p.h. It may have been six minutes later that he heard the rattle of his own guns behind him, and at the same moment noticed the leader's rear gunner in action. The attack was on!

Suddenly there appeared, over the leader's machine, a slim twin-engined German fighter, skimming along at a tremendous pace, and making a climbing turn to starboard as it drew ahead of the bombers. It could only be one of the new "Messerschmitt" 110's.

It never completed that turn, for with one consent the three front gunners let fly. The "Messerschmitt," half way through the turn, changed into a steep turn and disappeared from the P.O.'s view, a gush of steam showing that the radiator had been hit.

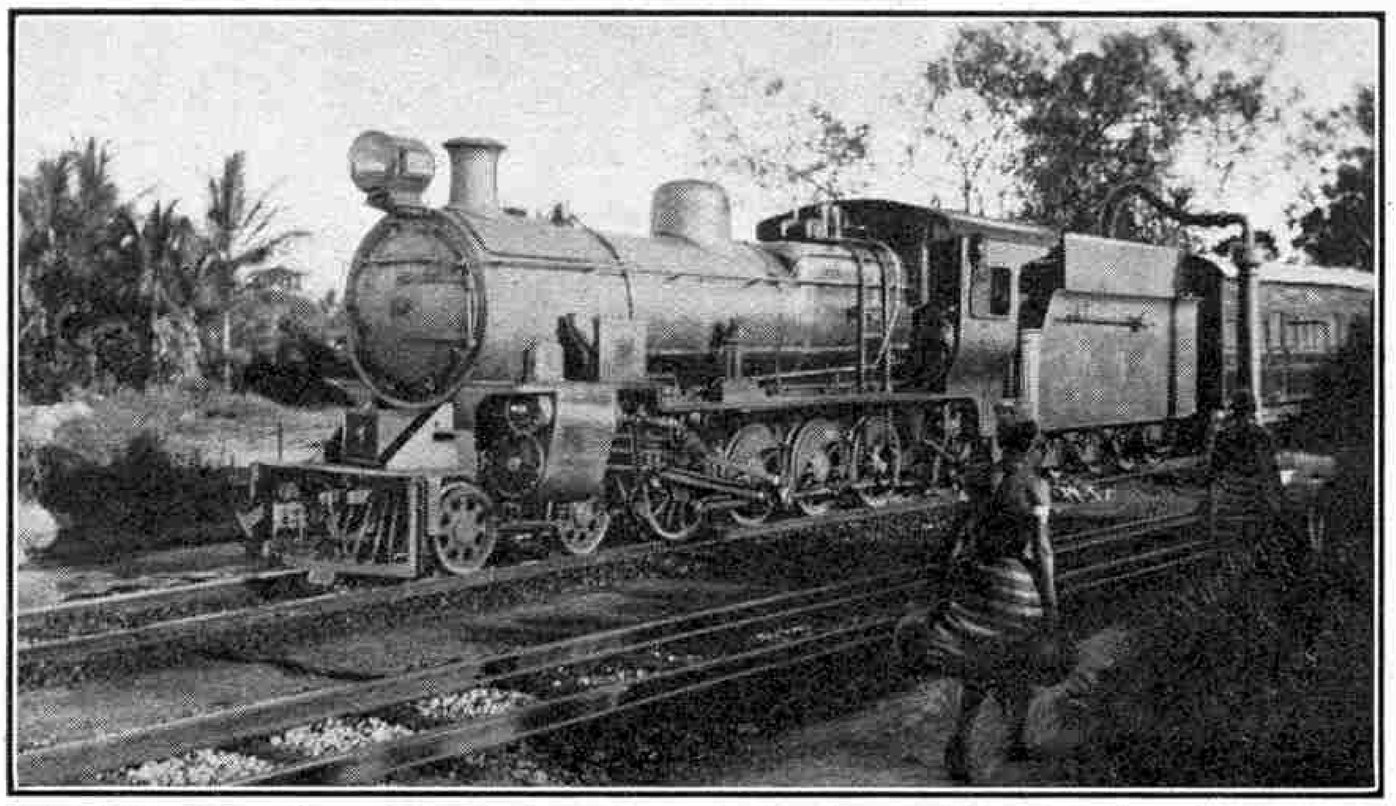
And now he found an almost irresistible temptation to break formation and see what was happening behind. He knew, however, that this would be fatal, not only to himself, but to all three machines.

There came more firing from the rear. Leaning over to the right he was able to look along the corridor leading to the rear turret, where he could see his tail gunner at work. Although he could not see the enemy, he knew that each German as he came within range was met with the concentrated fire of the three rear turrets. Later he learned that two more of the enemy were sent crashing down into the sea.

But that he could not know just yet. What he did know was that there came a sudden ripping of the fabric of his port wing. He was under fire at last. He had scarcely realised this fact when something flickered close to his face, and he saw that the mica window panel was punctured. He became aware that in front and below him his front gunner sat on the floor, holding one leg. Then, as suddenly as it began, the stream of lead ceased.

He had time to be thankful that it was bullets, not shells, that had found him, and then the three machines, still losing height, disappeared into the gathering darkness near sea-level.

His first air-raid, and his first air battle, were over.



A 2-8-0 woodburner, the smallest main line engine used on the Kenya and Uganda Railway, a metre gauge line. Photograph by J. C. Elliot, Kenya.

Forgotten Steel Trails—

(*Continued from page 185*)

of Yorkshire, the object being to tap the rich woollen district of Dewsbury and Huddersfield, and to place Bradford on a direct main line to Scotland. For one reason and another this scheme was not carried out in its entirety, but the Midland did construct a five-mile branch from Mirfield into Huddersfield; this was only used for goods traffic, although a big passenger terminus had been planned at Huddersfield. Owing to the more favourable lie of the ground being already occupied by existing railways, the Midland's Huddersfield branch had to be constructed very expensively, with several fine but costly viaducts of both steel and brickwork. After amalgamation, the Midland's goods station at Huddersfield was connected up direct to the former London and North Western's Manchester–Leeds line, so that the greater part of the Mirfield–Huddersfield branch became redundant. Recovery of some of the bridge structures on this line was proceeding when the present war broke out.

All over the country there are melancholy reminders—grass-grown embankments, crumbling abutments, rusty girders—of otherwise forgotten chapters in British railway history, of lines that have served their purpose and have been left prey to time and weather. Now that the country is again at war it is to be expected that there will be an intensive survey of all such moribund transport units, to see whether there is a place for them in the nation's war economy. Rumour has even suggested, for instance, that the enhanced demand for British iron ore might bring about the resuscitation of the Edge Hill Light Railway, which was built to serve an orefield near the site of the historic Civil War battle, and which was abandoned about 15 years ago. Another half-forgotten line now mentioned in the same connection is the West Somerset Mineral Railway, serving ore-mines in the hills above the little port of Watchet; the railway finally closed down 30 years ago, and its inland terminus is now a farmyard! Even where railways are no longer capable of being reopened, enquiry is likely to be directed towards the realisation for scrap of fixed assets, such as bridges, rails, and other equipment that can readily be reached and removed.

So a few of our Phantom Railways are likely to be in the news again. But for most of them, only the notes and camera of the historian now record the stories of how railway enterprise blossomed and died in rural and industrial corners of Britain.

Air-Raid Precautions on London's Underground—

(*Continued from page 167*)

to the Piccadilly and Northern lines by solid concrete bulkheads some five or six feet thick. This was done just before the outbreak of war, the station being closed to enable the work to be carried out. Now, to allow the same protection to be afforded and at the same time to permit the station to be used, three of the bulkheads have been replaced by manually operated steel bulkhead doors that can be closed in a manner similar to that adopted for the tunnel gates in the event of danger.

The 1940 "Astra" Catalogue

The 1940 Catalogue issued by our advertisers Astra Pharos Ltd. presents a very attractive range of working searchlights and guns of all kinds. Among these there is a splendid detailed model of the latest anti-aircraft searchlight, the beam of which is 4 in. in diameter. Another fascinating model is that of the 3.7 in. anti-aircraft gun, which incorporates all the features of its prototype. This and certain other guns in the range fire real projectiles by means of caps loaded in a shell case, and there is a loud report with a realistic flash.

A copy of the catalogue will be sent to any reader who writes to Astra Pharos Ltd., Landor Works, Askew Road, Shepherd's Bush, London W.12. Applicants should mention the "*M.M.*" when writing.

A Skybird League Rally in Northern Ireland

We have received details of a Skybird League Rally to be held in Northern Ireland on Saturday, 20th April. The scene will be the Ards Airport, and the Rally will commence at 2.30 p.m. There will be open and club competitions for handsome prizes, including the Marquess of Londonderry's Challenge Cup, and other valuable trophies, and there also will be a special prize for the best machine entered by a novice.

The Rally is being organised by Lady Mairi Stewart, to whom entries must be forwarded not later than 12th April. Forms for this purpose can be obtained on application to the District Commodore, Lady Mairi Stewart, Mount Stewart, Newtownards, Co. Down, N.1.

Competition Corner

HIDDEN TITLES CONTEST

[illegible]

The weird collection of marks seen above will provide our readers with a splendid opportunity of showing their skill in deciphering word puzzles. Each line shows what is left of the title of the heading of an article that appeared in the *"M.M."* during 1939. We asked our artist to disguise these as far as possible by removing portions of the letters, and in this month's competition we want readers to tell us what these concealed titles are. No letter has been removed entirely, and of course nothing has been added, so that the contest is quite straightforward.

It is not absolutely necessary that competitors should already know the titles themselves, for the words in all of them are of general type. Thus entrants who have only just begun to take the Magazine will have as much chance as those who have been regular readers for a long time. We want our new readers to take part in all our competitions, and here is a splendid opportunity for them to make a start with good prospects of excellent prizes.

As usual there will be two sections, for Home and Overseas readers, and in each section four prizes of Meccano or Hornby Train products to the value of 21/–, 15/–, 10/6 and 5/– will be awarded to competitors who submit the best efforts. There will be consolation prizes in each section. Novelty and neatness in setting out the solution will be taken into account by the judges in the event of a tie between two or more competitors for any prize.

Entries should be addressed *"April Title Puzzle,* Meccano Magazine, Binns Road, Liverpool 13." The latest date for receiving entries in the Home Section is 30th April, and the closing date in the Overseas Section is 31st July.

April Photographic Contest

This month we announce the first of our series of photographic competitions for 1940, which we shall continue throughout the summer. The conditions ruling in this contest are very simple. Competitors are asked simply to submit photographs in each contest, and the prizes will be awarded to the best sent in. Entries may be outdoor scenes, or examples of indoor photography, but in each case an appropriate title must be written on the back of each. An entry may consist of more than one photograph, but no competitor can be awarded more than one prize in any one monthly contest.

War conditions have brought certain restrictions on outdoor photography. These apply to military, naval and Air Force subjects, and readers should take care to avoid photographing such things as docks, barracks, aerodromes and troops on the march. Intending competitors are urged to read the article on page 200 of this issue, which will form a useful guide.

Each month's entries will be divided into two sections, A for readers aged 16 and over, and B for those under 16. In each section prizes of Meccano products or photographic material to the value of 21/– and 10/6 respectively will be awarded. There will be two similar sections with prizes of the same value for Overseas readers.

Entries in this month's competition should be addressed *"April Photo Contest,* Meccano Magazine, Binns Road, Liverpool 13." The closing date in the Home section is 30th April and that in the Overseas section is 31st July.

COMPETITION CLOSING DATES

HOME	
April Hidden Titles	... 30th April
April Photographic Contest ...	... 30th April
OVERSEAS	
Cover Voting Contest	... 29th April
Advertisement Contest ...	... 29th April
Missing Words Contest ...	... 31st May
February Drawing Contest ...	... 31st May
March Crossword Puzzle Contest	... 29th June
March Drawing Contest ...	... 29th June
April Hidden Titles Contest ...	... 31st July
April Photographic Contest ...	... 31st July

COMPETITION RESULTS

HOME

"February Drawing Contest."—First Prizes: Section A, E. Oldham (Hyde); Section B, J. L. Potter (Cowdenbeath). Second Prizes: Section A, E. C. Knight (Birmingham 16); P. F. Handley (Bexleyheath). Editor's Special Prize: G. Slater (Wolverhampton). Consolation Prizes: J. Coleman (Bournemouth); H. A. S. Jones (London E.6); A. Ware (Crowborough); A. Holmes (Lincoln); L. Thompson (Edinburgh).

"February Missing Words Contest."—1. W. K. Cocking (Redruth). 2. J. Laing (Dunstable). 3. J. D. Hollingworth (Birmingham 17). 4. F. C. Whalley (Wallasey). Consolation Prizes: A. Elvey (London S.E.9); H. Pennifold (Partridge Green); F. Cooper (Margate); O. Sharpe (Gloucester); R. Williams (York).

OVERSEAS

"November Price Codes Contest."—1. J. Lorimer (Hastings, N.Z.). 2. M. Most (Natal, S. Africa). 3. F. H. Brown (Toronto, Canada). 4. D. Perrin (Greymouth, N.Z.). Consolation Prize: J. S. Manduca (Sliema, Malta).

"November Drawing Contest."—First Prizes: Section A, K. Bakker (Capetown, S. Africa); Section B, P. Calarco (Kitchener, Canada). Second Prizes: Section A, J. M. Demanuele (Valletta, Malta); Section B, W. E. Cottrell (Hamilton, N.Z.); P. Watson (Capetown); M. Jones (Toronto).

FIRESIDE FUN

SILLY

The old engine-driver had retired after years of service, and the company had given him a disused railway coach in which he proposed to live in a field close to the railway.

One day two of his friends decided to call on him. It was raining heavily when they arrived and much to their surprise found the old chap seated outside the coach smoking.

"Why," said one, "what on earth are you doing sitting out in this rain?"

"Ah," replied the pensioner, "the silly blighters have sent a non-smoking compartment."

* * * *

A heedless professor, named Squill,
Was taken most painfully ill.
The cause of the ache?
He'd gulped down, by mistake,
A pill-box instead of the pill!

* * * *

"Bah," roared the sergeant, "we don't think nothin' of a 15-mile walk in this regiment."

"I don't think much of it myself," said the exhausted recruit.

* * * *

A man was working on some scaffolding when he accidentally dropped a brick, which fell on a negro's head. The negro looked up in surprise, and shouted:

"Don't be so careless up there! You made me bite my tongue!"

* * * *

Office Boy: "The boss is taking an interest in me."
Clerk: "Is he?"
Office Boy: "Yes; he asked me if I worked here."

* * * *

Sambo had found a job for the week on a railroad gang, and was taking leave of his family when his wife came to the door.

"Come back, Sam. You hasn't cut a stick of wood fo' de stove, and you'll be gone fo' a week."

Sam looked very much aggrieved. "Honey," he said in a tone of injured innocence, "what's de mattah? You all talks as though Ah was takin' de axe with me."

* * * *

"Now which of the great men of the past would you rather be, John?" asked the teacher, after a long talk on the celebrities of history.

"None of them," replied Johnny promptly.

"None of them? Why not?"

"'Cause they're all dead."

* * * *

A policeman saw a crowd of boys playing football in the street. On chasing them, he caught one and, after a severe caution, let him go. Some time later the policeman was moved to another beat, where he caught a boy from a crowd footballing.

"Aren't you the boy I caught some time ago?" he asked.

"Yes, sir," whimpered the boy; "but I can't help it. This is our away match."

* * * *

COMFORTING



Boots: "Are you the gentleman who wants to be awakened to catch the early train?"

Guest: "Yes."

Boots: "Then you can go to sleep again, you've missed it."

SILENCED

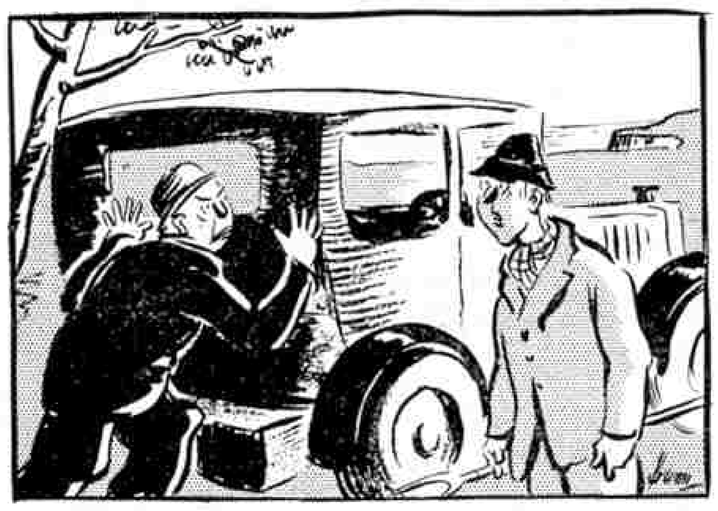
Two motorists met at a bridge too narrow for two cars to pass.

"I never back for any old fool," shouted one driver.

"That's all right," replied the other quietly, as he shifted into reverse; "I always do."

* * * *

SICK OF IT



Disgusted Motorist: "Lend me a shoulder, will you?"

"Gosh, y'aint gonna try to push it clean to a garradge, be ye?"

"No, if I can get it just as far as that cliff, that's all I ask!"

* * * *

"Don't you think the dentist's waiting room is gloomy?"

"Not half so depressing as his 'drawing-room'."

* * * *

There was a young fellow called Beale
Who went for a ride on a seal.
He would have survived
If the seal hadn't dived,
And a shark hadn't wanted a meal.

* * * *

Tourist: "Five miles to the village? Great Scott! What made them build the station all that distance from the place?"

Porter: "I really couldn't tell ye, sir, unless they thocht it might be mair use doon here by the railway."

* * * *

Bill, a builder's labourer, was renowned for the fact that he always pulled his barrow along behind him. One day an inquisitive mate decided to question Bill on this point.

Mate: "Why do you always pull the barrow instead of pushing it, Bill?"

Bill: "Because I'm sick o' the sight of the thing."

* * * *

Shopwalker: "Look here, I heard you say to that customer, 'No, we haven't had any for a long time.' You should never say anything like that—always say, 'We will get it for you.' What was it the lady wanted?"

Salesman: "Sunshine."

* * * *

"Now, my son," said mother, as her boy was starting off to join the Navy, "remember to be punctual in rising every morning, so you will not keep the Captain waiting breakfast for you."

* * * *

Footpad: "Get ready to die. I'm going to shoot you."

Victim: "Why?"

Footpad: "I've always said I'd shoot anyone who looked like me."

Victim: "Do I look like you?"

Footpad: "Yes."

Victim: "Then shoot."

* * * *

Motorist (stopped for dangerous driving): "Constable, what I know about motoring would fill a book."

Constable: "Yes, but what you don't know would fill a hospital."

* * * *

Genial Motorist: "May I offer you a lift, sir?"

Absent-minded Professor: "No, thank you, I have no use for one. I live in a bungalow."

* * * *

THIS MONTH'S HOWLER

St. Andrews is a salt taken by Royal and Ancient people.

MAKING SURE

Father: "Now, Bobby, play with those other children and don't get into mischief while I have a bathe, and when I come out I'll give you twopence."

Bobby: "An' if you don't come out, will mummie pay me the twopence?"

* * * *

Two small boys were home for the holidays and were becoming rather troublesome, so their father suggested that they should "pot" some geraniums for him. The suggestion was met with approval, and off the two boys went to start the job.

Later in the day the father asked what they had done with the trowel.

"Oh," said one boy, "we didn't use the trowel, we just took turns with the airgun."

* * * *

An old negro was being examined for the job of rural postman. One of the questions asked was: "How far is it from the Earth to the Sun?"

The old darky looked frightened, and exclaimed: "If you is gwinter put me on that route, Ize resignin' before I begins."

* * * *

"Are you the plumber?"

"Yes mum."

"Well please be very careful while you are doing your work. All my floors are highly polished."

"Oh, don't worry about me, mum, I shan't slip, I've got nails in me boots."

* * * *

Junior Reporter: "I've been sent by my paper to 'do' the murder."

Country Policeman: "Well, I'm sorry you're too late. Somebody else has done it."

* * * *

"Now, Billy dear, what will you say at the party when you've had enough to eat?"

"Good-bye."

* * * *

Policeman: "Didn't you see me hold up my hand?"

Driver: "No."

Policeman: "Didn't you hear me blow my whistle?"

Driver: "No."

Policeman: "Well, I might as well go home. I don't seem to be doing much good here."

* * * *

"That fellow Grey must live in a very small flat," said White to his wife.

"What makes you think that, Henry?" she asked.

"Well, didn't you notice his dog when we passed him just now? He wags his tail up and down instead of sideways."

* * * *

"Was that sandwich quite fresh that you sold me just now?"

"Quite, sir. Each one is wrapped in transparent, airtight paper."

"I wish I'd known."

* * * *

Tramp: "Kin ah cut your grass for a meal, mum?"

Lady of the House: "Yes, my poor man. But you needn't bother cutting it; you may eat it right off the ground."

* * * *

Captain: "Where are you going with that saw?"

Messboy: "The cook says we're out of firewood and sent me to cut up the ship's log."

* * * *

CROSS TALK



Landlord: "One of your great relations, I suppose, Pat?"

Pat.: "No, no relation at all, sir, just an acquaintance, like yourself!"

* * * *

"Waiter, these are very small oysters."

"Yes, sir."

"And they don't appear to be very fresh, either."

"Then it's lucky they're small, ain't it, sir?"

* * * *

Pat, when driving a lorry, stopped suddenly on the road. The car behind crashed into the lorry, and its owner sued the Irishman.

"Why didn't you hold out your hand?" the judge asked Pat.

"Well," said Pat, "if he couldn't see the lorry, how in the world could he see my hand?"

* * * *

Sergeant: "Anyone here know anything about music?"

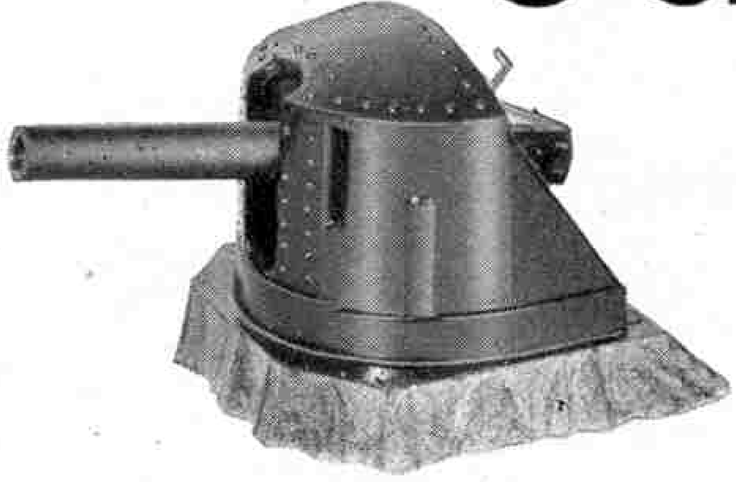
Several Recruits (eagerly): "Yes, sergeant."

Sergeant: "Then give a hand and shift the piano to the concert hall."

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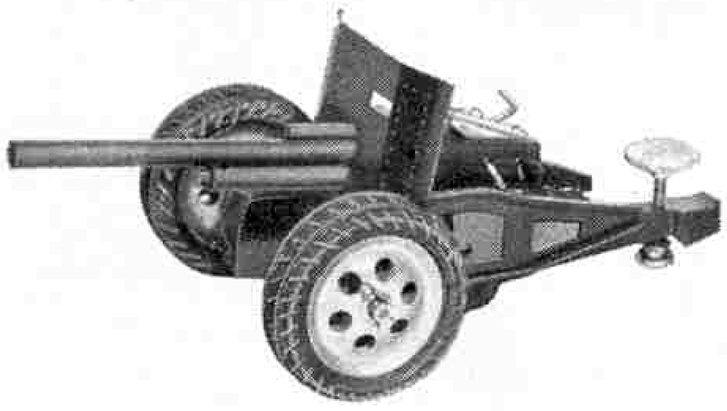
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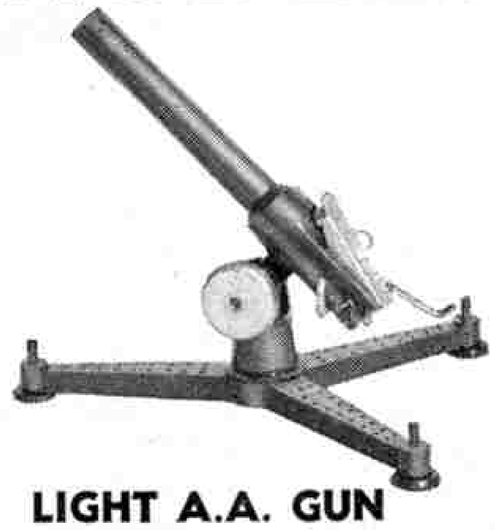
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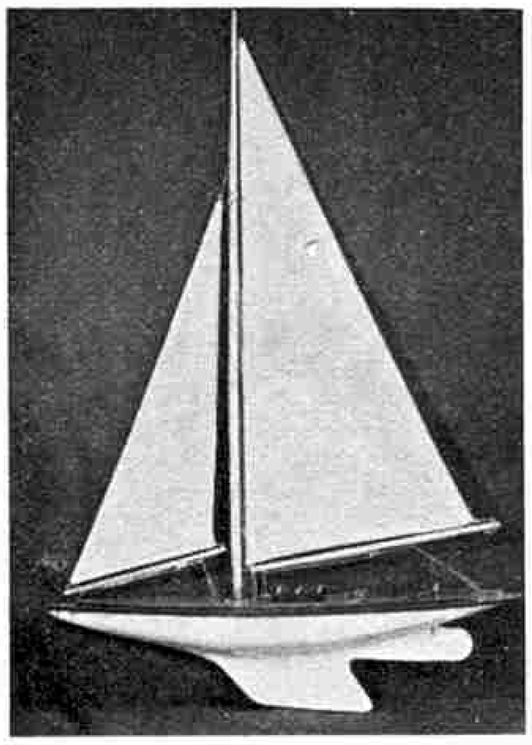
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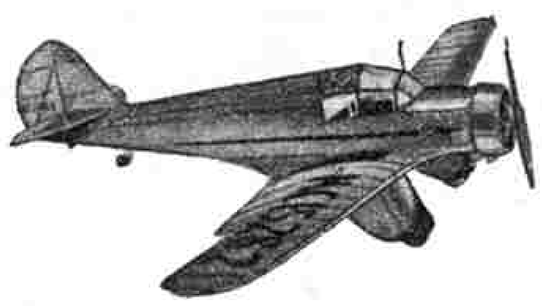
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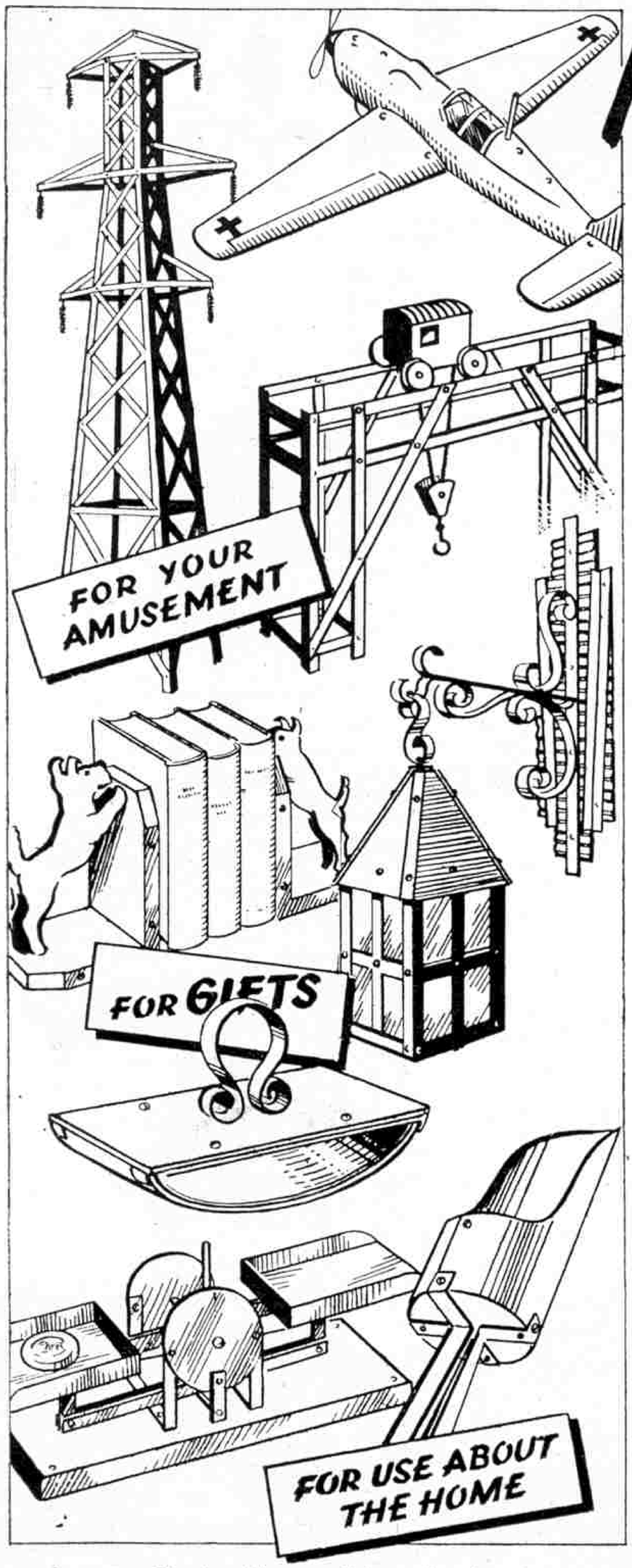
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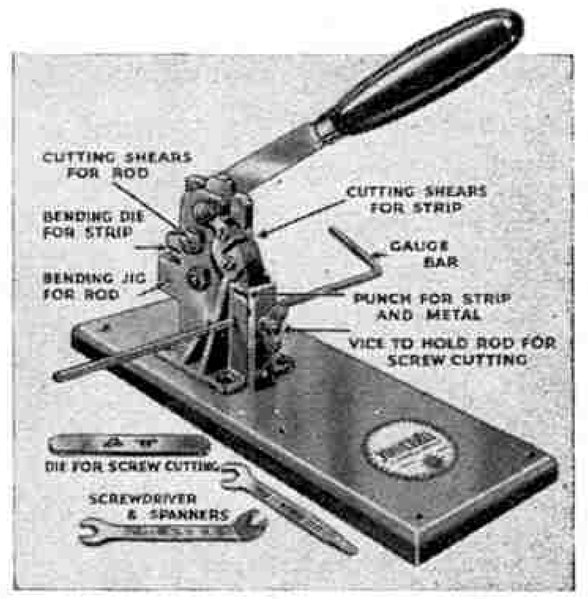
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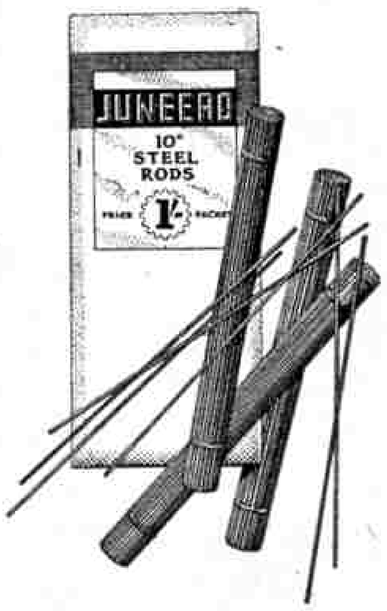


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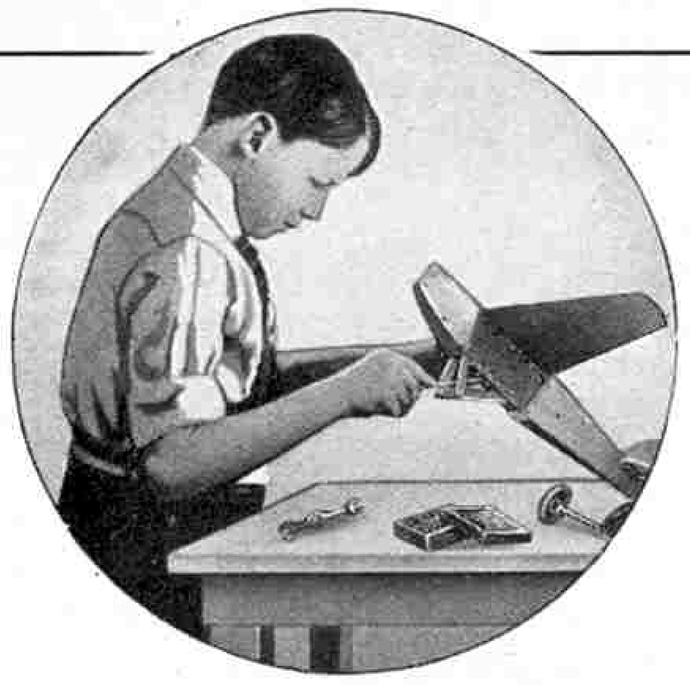
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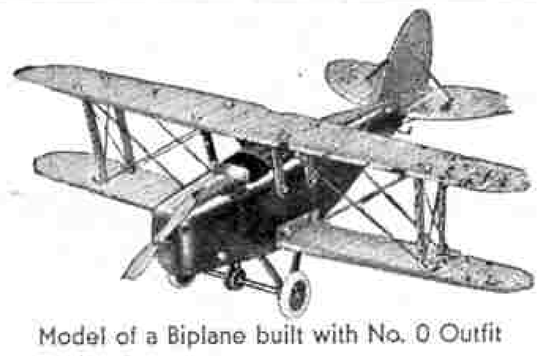
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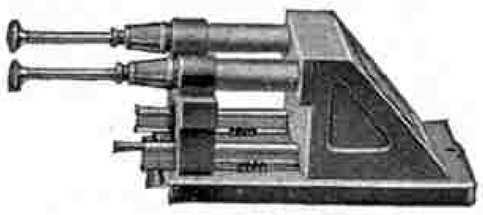
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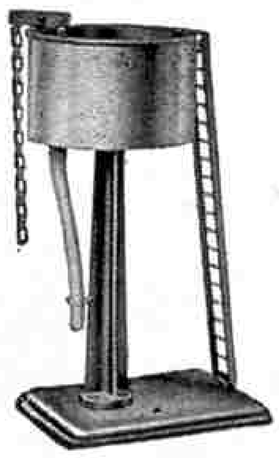


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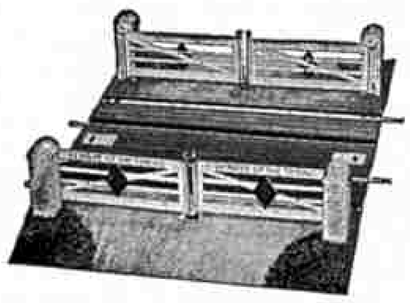
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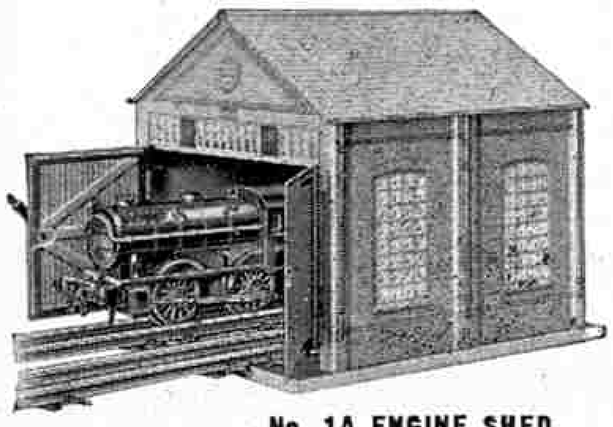
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The Magic Motor

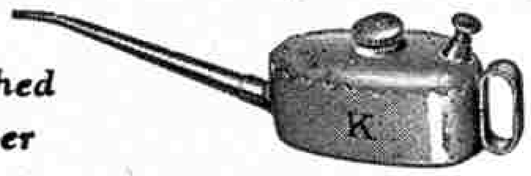
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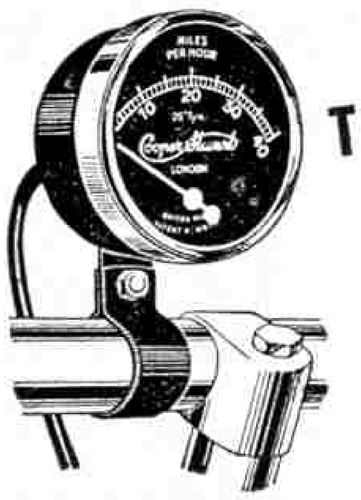
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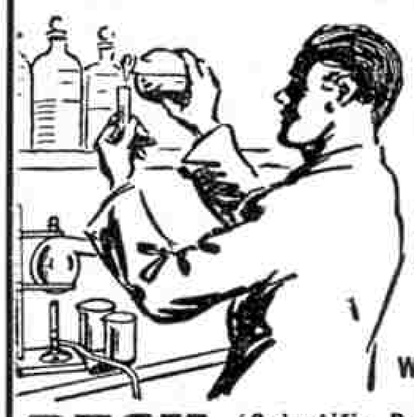
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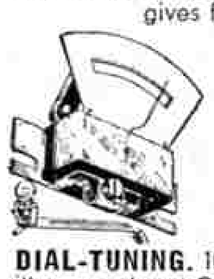
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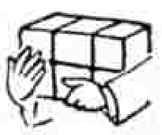
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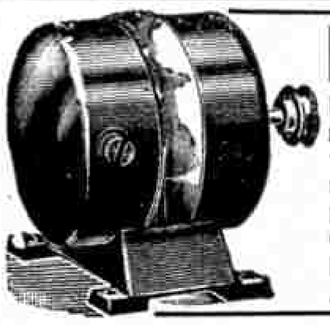


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BINNS ROAD, LIVERPOOL 13

This Month's Special Articles

	Page
A Day Out for the Bombers	162
Air News	182
Air-Raid Precautions for London's Underground	166
A Motor Racing Mechanic Speaks ...	176
Books to Read	180
Canada's Tractor Freight Trains ...	168
Competition Corner	209
Engineering News...	170
Fireside Fun	210
From Our Readers	178
Guild Pages	194–5
Hornby Railway Company Pages ...	201–7
Little Ali of Zanzibar	169
Meccano Model-Building Contests ...	192
Meccano Model-Building Contest Results	193
New Irish 4–6–0 Locomotive	164
New Meccano Models	188
Photography During the War	200
Railway News	174
Romance of Abandoned Railways ...	184
Stamp Collecting	197
Stamp Gossip	199
Suggestions Section	190
World's Largest Slate Mine	172

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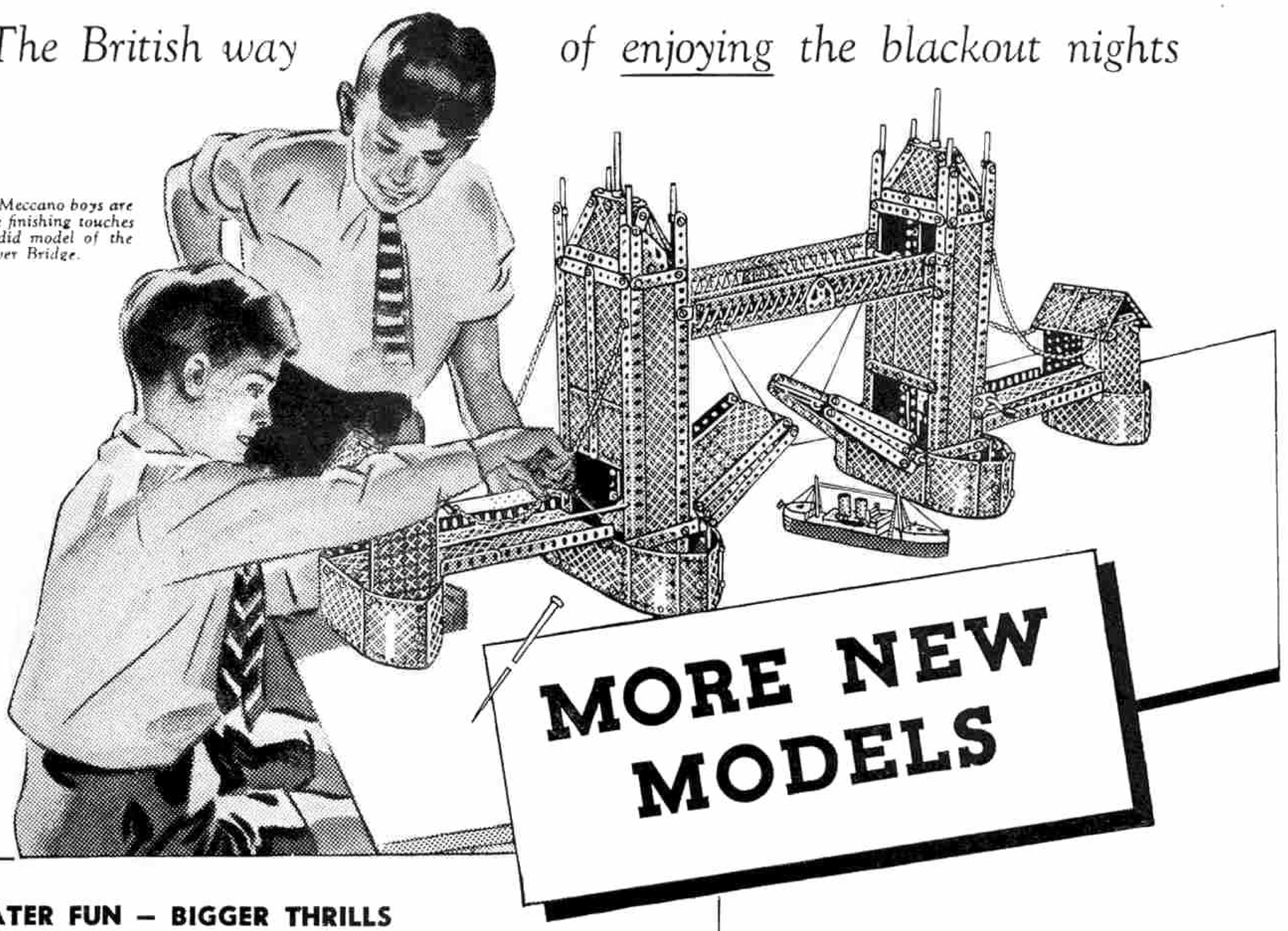
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